



CATJ

OFFICIAL JOURNAL
OF THE
COMMUNITY ANTENNA
TELEVISION ASSOCIATION

MAY 1980



"Channel Expansion the painless way."

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Jim was confused about channel expansion and he frankly admitted, a little frightened. His twelve-channel system used to be more than enough to hold his subscribers' interest. Now, with greater competition from local TV stations, his subscribers wanted more service to justify the monthly fee. It was time to expand.

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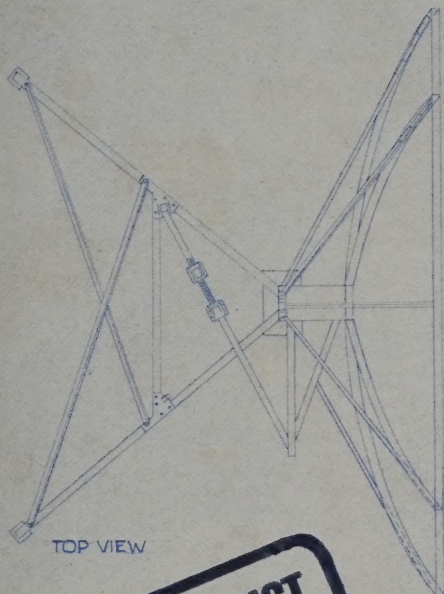
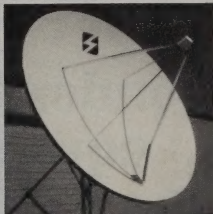
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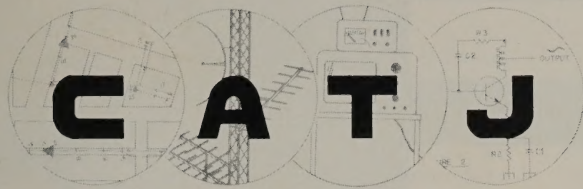
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MAY
1980

Volume 7 Number 5

PUBLISHED MONTHLY, AS ITS OFFICIAL JOURNAL, FOR THE COMMUNITY ANTENNA TELEVISION ASSOCIATION, INC., OKLAHOMA CITY, OKLAHOMA, AS A SERVICE TO ITS MEMBERS AND OTHERS PROVIDING CATV/MATV SERVICE TO THE TELEVISION VIEWING PUBLIC AND BROADBAND VIDEO/AUDIO DATA COMMUNICATION SERVICE.

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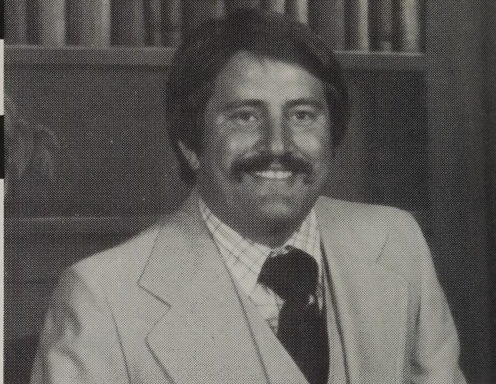
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—OUR COVER—

The cover shows how helpful a **pole stand** can be for maintaining equipment. Notice the **Safety** features in use during this procedure.

BEN CAMPBELL, President of CATA, Inc.



CATA—THE ASSOCIATION WITH AN INDEPENDENT VOICE

There was a little bit of surprise in the voice of some other cable association executives when they found out that the Community Antenna Television Association had decided to launch a membership drive just now. "How can you do that?" they asked, "membership drives only work when there is a crisis—and cable doesn't have any real big crisis right now." Well, that is precisely why we have decided to strengthen our membership at this time. There is no crisis. We have handled most of the issues that are threatening us. That doesn't mean that there won't be more in the future. Certainly copyright is coming at us again, and so is the whole issue of distant signal and syndicated exclusivity rules, as well as "retransmission consent" and telephone cross-ownership. But now, it seems to me, when we have a small "breather" from all these problems, is the time to start storing up our ammunition and keeping our powder dry! It doesn't do us any good to get into the upcoming fights and **then** find out that we need more support—it's too late then. **NOW** is the time to build our strength, and I am asking all cable operators, big and small, to join us so that we may do just that.

CATA, as we all know, was born in controversy. The issue was Copyright, and the dispute was over the fact that some of the largest cable television operators, who also happened to be copyright owners, were the ones urging the National Cable Television Association and all of its members to simply concede on the issue of copyright. Some of the smaller, independent operators could not understand that strategy. Certainly, we all knew that whether it was "right" or not, it looked like Congress was going to impose some sort of copyright fee on cable television operators. But we couldn't see that it would benefit us by going into the negotiations already on our backs! CATA was formed to fight the copyright battle. And we did very well. By the time it was over, instead of having one, flat, across-the-board fee schedule which would have hit the small and medium-sized systems the hardest, CATA got Congress to recognize that there are differences in the cable television industry and they adopted a lower fee schedule and reduced filing requirements for the small and medium-sized systems. CATA had justified its existence.

It was at this point that many operators began to realize that no matter how good a job one Association was doing for the cable television

industry, that Association, primarily funded by the very large media conglomerates, could not possibly represent all the views in the cable industry all the time. There would naturally be times when the interests of the very large operators would be different, or at least have a different perspective from the rest of the industry. CATA set out to make sure that the interests of the independent operators and the smaller MSO's were also taken into account. Some perceived this as a "war" between the NCTA and CATA. It wasn't.

The initial concern seemed to be that there shouldn't be a "split" in the cable industry—that we should all agree to speak with "one voice." But there was a problem with that. Since the very big companies controlled that "voice" (after all, it was their money, why shouldn't they have a major say in what the policies of the Association would be) the interest of the rest of the industry too often were not heard when the shouting started. This, I should point out, is not a criticism of the NCTA. They are doing the job they were hired to do, for the people who pay the bills, and they do it very well. It is, however, necessary to recognize that they can't possibly be all things to all people all the time. CATA filled the void.

There were many legitimate issues that could best be argued by an Association not controlled by the media conglomerates. The burdens of "Certificate of Compliance" filings at the FCC, for instance, could not be very effectively argued by an Association whose major members had batteries of lawyers in Washington, New York and Denver. The cost of a "nonduplication switcher" could not be said to have the potential of destroying the financial health of a company with hundreds of thousands of subscribers. CATA took on these issues, and the result, with the aid of the rest of the cable industry, was to convince the FCC to grant exemptions of its rules to systems with less than 1000 subscribers, to eliminate the CAC rules, to allow small earth terminals, and so on.

I have heard the argument that CATA has been so successful in protecting the "small" system operator that it is in danger of running out of things to do! We have, after all, won most of the fights that we have started. I don't think that is a reasonable fear. I would love it if it were true, but it isn't. You must remember that over half of all cable systems in the United States have less than 5000 subscribers. While

many of the big operators now focus their attention on the massive big-city franchises, the rest of us still have to protect and expand the business that we have. That is what CATA is all about.

CATA works with cable television operators. We provide the practical, day-to-day information that a cable operator or manager needs to run his business. This is just as true for the manager of a system owned by a media conglomerate as it is for the independent operator. Having meetings in Washington, Atlanta, Dallas or Denver of the top corporate executives of the major companies is all well and good, but the managers and operators of the systems still need to know what is going on, and what they have to do on a day-to-day basis to make the cable business successful. CATA works directly with the people who are doing the work. The CATA Newsletter keeps the operators informed as to what is going on, and what they must do to keep their operations on an even keel. CATJ gives practical engineering information on how to run a system better and cheaper. Members have the security of knowing they can call the CATA Washington office and get quick information on a legal question without running up a bill.

But what is most important is that the people really doing the work get the sense that they, too, are participating in the process of molding the future of their industry—that their views, their voices will be heard, as well as the voices from the corporate board rooms. This has proved to be beneficial not only for the independent operators, but for the media giants

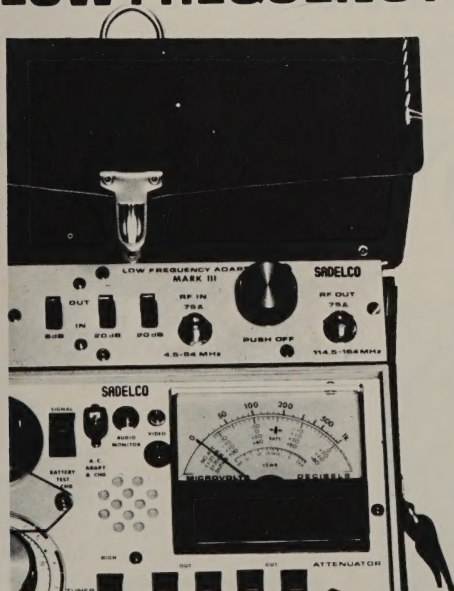
as well. What we have learned is that two voices are indeed better than one. On many issues the NCTA and CATA are in agreement. However, we usually come from different points of view. This is nothing new. The largest broadcasters have their own Association, the Association of Maximum Service Telecasters, as well as belonging to the NAB. The telephone companies have a multiplicity of groups representing their differing points of view, and now cable does too.

I think it is safe to say that even the NCTA's Tom Wheeler will agree that when the House Copyright Subcommittee has a hearing and there are over 20 witnesses listed to speak against cable, it is nice to have another strong voice on cable's side! When the copyright issue rears its ugly head again, or when "retransmission consent" is proposed for yet another time, all cable operators, big and small will want as much support, from as many directions as they can get, to be sure cable's future is protected. That is what CATA is all about.

Our new membership drive is aimed at all levels of the cable industry. We have structured a new set of Bylaws to allow for "Corporate" membership so that even the largest MSO's can support CATA (with maximum yearly dues of \$5000) while at the same time protecting the integrity of CATA's independent voice. Some large cable operators have already joined us. Not with the intention of trying to alter our position, but out of a realization that two voices

Continued on Page 56

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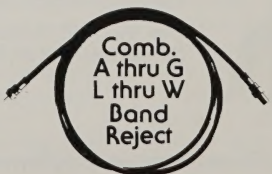
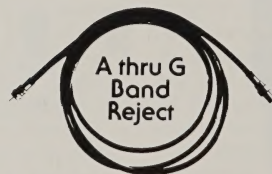
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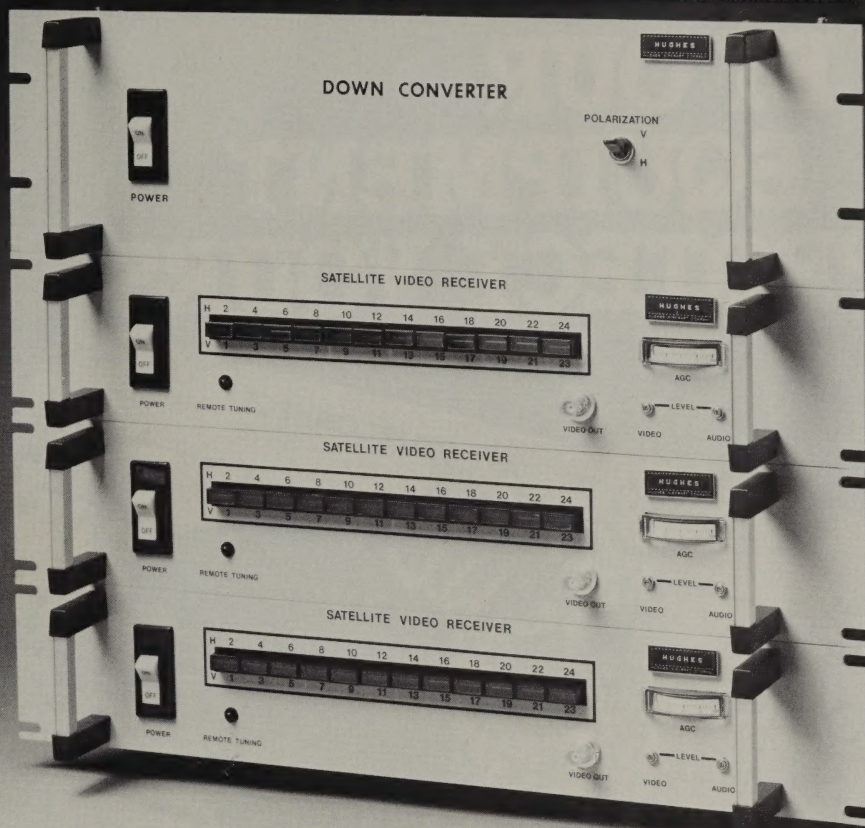
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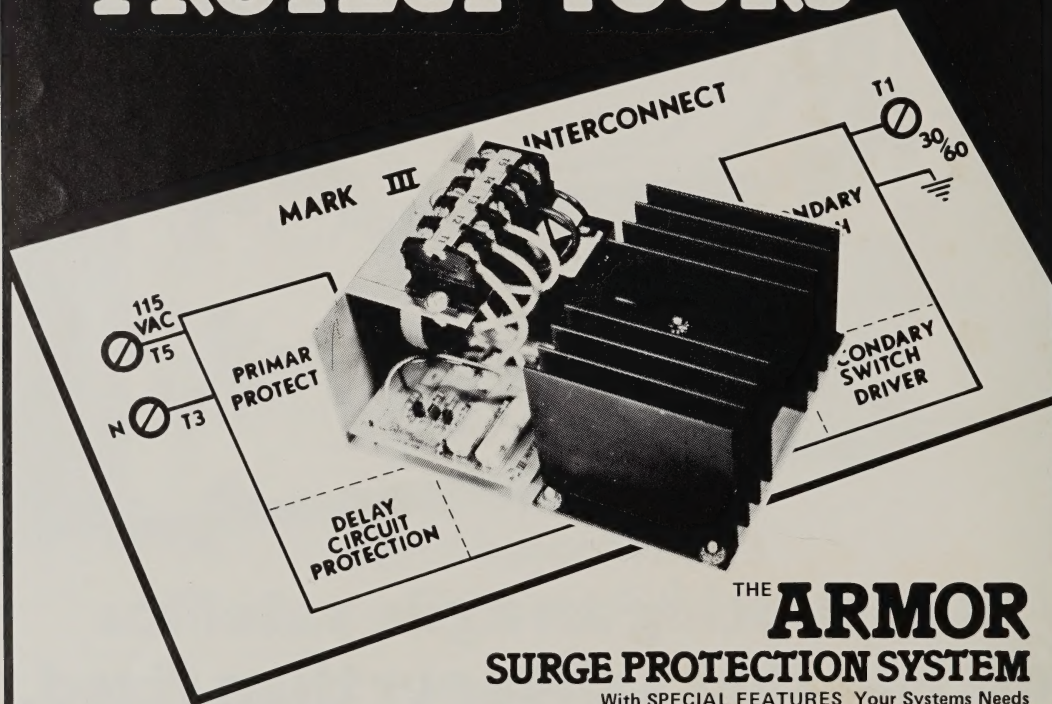
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**CCOS
'80**

July 27-31, 1980



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- **Underground Construction**
- **Marketing**
- **Computer Services**
- **Updating Your Cable System**
- **Personnel Management**
- **Ladies Session on "What Is A Cable System" and its components**
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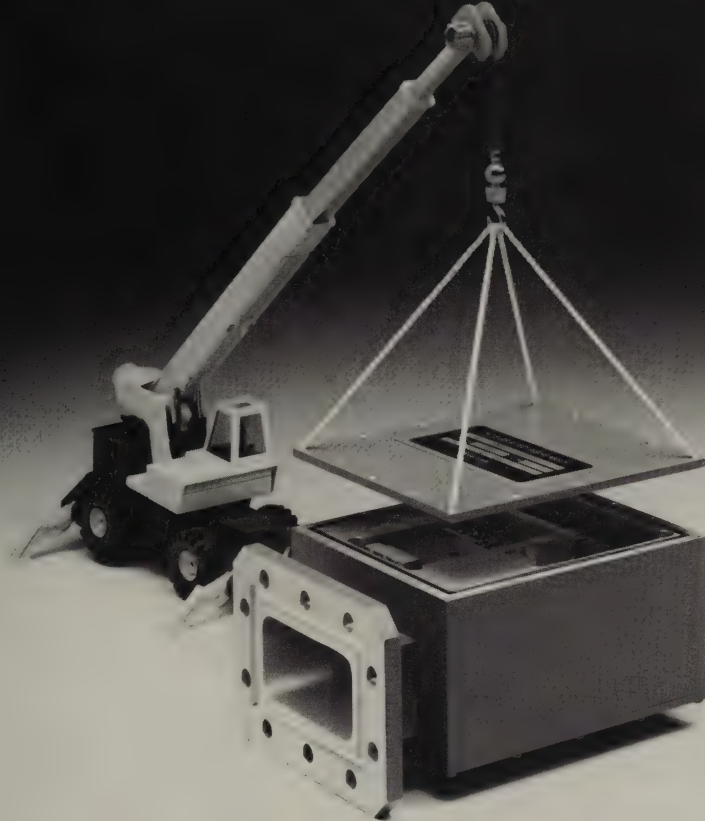
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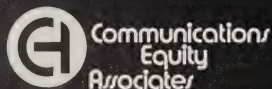
1980...So Far

January, 1980

SOLD

Madison Communications, Inc. Island Cable Corp.

The undersigned represented the buyer in this transaction. This notice appears as a matter of record only.



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January, 1980

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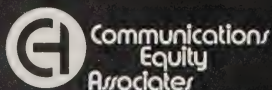
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January, 1980

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Rankin County Cable Co. Rankin County, Mississippi

The undersigned represented the buyer in this transaction. This notice appears as a matter of record only.



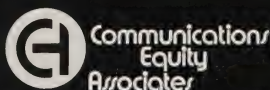
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January, 1980

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Community Television Cable System of Lee County, Inc. Lee County, Florida

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February, 1980

SOLD

Cable Systems Serving Davie, Dania, Lauderdale Lakes, Cooper City and Portions of Broward County, Florida

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"...Thank you and your associates for the excellent technical support supplied by General Cable through all phases of design and construction of our recent submarine cable crossing in our Bergen County, New Jersey system.

"Our primary concern was to install a cable with superior mechanical strength and high specific gravity while still retaining the same electrical characteristics as your standard Fused Disc Cable.

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"Further, I was delighted at your ability to provide Fused Disc III cable for application at 400 MHz and beyond. VCC has been a leader in the development of 400 MHz systems and two-way services with one 400 MHz system in the pre-construction stage already and with several franchises pending where we have specified 400 MHz operation."

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RCA Cablevision
Systems

What To Expect From A Trencher

by Wayne Sheldon
Sheldon Electronics
San Jose, Ca.

Since, in burying cable, we generally need a trench approximately only six inches wide and a maximum of three feet deep, we need only consider the smaller machines. By our standards a 40 h.p. machine is large, but it is tiny compared to the big machines pipeline companies use. Some of the methods of spoil removal used on big machines will not work satisfactorily with our small ones. The method that works satisfactorily under most soil conditions is the endless chain saw type or, for solid rock, the wheel with rotating teeth. At this time we will discuss the various sizes of chain type machines.

To be competitive, all manufacturers make comparable size machines which have more or less the same capabilities. We will discuss the various features of the many models in the next issue. This month we will review the capabilities of the general classifications.

The smaller machines are in the 7 h.p. to 14 h.p. range. These usually have a one cylinder air cooled engine and generally are not a riding machine, although some models have a place to stand on while operating. These machines are too small to do any serious trenching on large projects as they do not have the power to move much soil. In easy digging you may get two to four feet per minute, but in hard digging it may take several minutes to the foot.

However, these are useful for several applications. They are small and you can get them into tight locations around buildings and into backyards where a larger machine will not go. Another good use for these smaller machines is in working around other services. For example, they do not have enough power to break a large plastic or transite water pipe if you accidentally hit it while trenching.

The next size up is those in the 20 h.p. range. All of these are riding machines and are considerably more rugged than the smaller ones. Again, these do not have enough power for serious trenching,

but if you only have occasional small projects, this size is easy to transport while still large enough to do some work. Trenching speeds will vary from about eight feet per minute in easy digging down to about one foot per minute in very hard soil. All manufacturers make rubber tire models and some make tracklayer types. Also, there is a wide selection of accessories available for these and the larger sizes.

Next larger are those in the 30 h.p. range. These are considerably heavier and stronger than the 20 h.p. machines, but most models are only slightly larger in size than similar 20 h.p. machines of the same type. This size is probably large enough for the average small system as production is fairly good. Digging speed can vary from about fifteen to eighteen feet per minute in soft soil down to about two feet per minute in hard soil. These will do some work with a backhoe.

The largest machines that will be used by most systems are those in the 40+ h.p. range. Again, the basic machine is not much larger than the 30 h.p. units. In some cases the basic unit is the same size with only a bigger engine and heavier drive train. Production can be considerably in excess of 20 feet per minute in soft soil down to five or six feet in very hard soil. The machine with a backhoe attachment is heavy enough to accomplish a fair amount of digging even in hard soil. If you have a large amount of backhoe work however, I would recommend having a separate unit. After all, the reason you buy a trencher is to dig trench. It won't do that while you have the machine tied up doing something else.

The size of the machine that you will buy will depend on several factors. The most important of which is the amount of trench you will be digging and the soil conditions you have. The purchase price of the machine is really a minor consideration. It is false economy to buy a cheap machine, then spend extra days or weeks on the job because it does not have the power to get good production.

After all the actual trenching will be the slowest part of the project. However, by similar reasoning it is foolish to buy the largest machine and then only do an occasional small project.

The physical size of the complete unit with all attachments is important. If you are working in restricted and close areas, you will require one of the smaller machines, but if in open areas, large size is not a problem. Most systems that do any large amount of underground eventually will own both a large and a smaller machine.

The two basic types are rubber tire mounted machines and tracklayer machines. With everything else being equal, horse power, soil condition, chain loading, etc., the tracklayer will produce considerably more trench than a rubber tire machine. In hard rocky soil or on uneven ground, it may produce nearly half again as much trench as a rubber tire machine. Unfortunately there are not many models of tracklayers available.

The biggest advantage of rubber tired machines is that you can cross over sidewalks, curbs, etc. without worrying about chipping or scratching the concrete. However, if you do not make extremely tight turns, a tracklayer with pavement tracks will do less damage to a lawn than a rubber tire machine. Tracklayers are also more stable and easier to control on steep slopes.

After you decide on the size and type of basic machine you intend to use, you must decide what options and accessories to purchase. If you will be digging trenches deeper than 20 inches or so, one option I advise on the 20 h.p. and larger units is the four foot, rather than the three foot boom length. The reason is that in digging deep trenches the short boom must lift the spoil nearly straight up. In so doing, much of it falls back into the trench and a lot of power is wasted just churning the spoil instead of digging new trench. The lower angle on the longer boom avoids this problem and the result is higher production. Also if you do need a trench deeper than 30 inches you can dig to approximately 44 inches with the four foot boom.

Another worthwhile option available on some models is the ability to move spoil to either or both sides of the trench. This gives you a little more versatility in working near buildings or along sidehills.

If you purchase a tracklayer, I advise the long track option if it is available. The machine is more stable on uneven ground. You can purchase either pavement or grouser type tracks. The grouser type should be used in undeveloped or steep locations. The street type which is smooth on the face is suitable for use on streets, lawns, etc. If you will be working in both types of areas you should consider buying both types of tracks as it only takes a short time to change from one to the other. One manufacturer makes a street track with polyurethane pads. This should be good on sidewalks and concrete areas.

Accessories available increase the usefulness of the basic machine. Two items that are definitely required on any machine of 20 h.p. or more are the

backfill blade and the crumber. The crumber scrapes the bottom of the trench, leaving it clear of loose dirt that falls back in as the trencher operates.

All manufacturers make a boring attachment for their trenchers. I prefer to have a separate machine for this but if you only have an occasional boring job, this accessory may be the best approach for your needs.

The backhoe attachment is expensive and except on the heaviest machine is too light to do much digging. Again, my feeling is that if you think you need a backhoe, I advise a separate machine. Personally I find so little use for a backhoe that I don't even own one.

Another useful accessory available for some machines is a sidemount kit. This allows you to offset the digging mechanism so that you can trench about even with one side of the trencher. This is handy for working along buildings, curbs, fences, etc. It is a major teardown and reassembly to change from center to sidemount, but **if you need this feature, you need it bad.**

One item that is on new machines, but is not on most older machines is a roll bar. This is now required by OSHA and if your machine does not have it, it should be added. Trenchers do get overturned, oftener than most people care to admit.

Once you have your trencher, you will want to get the most production in the least time. Probably the most important thing is the way the digging chain is loaded. Different soils and conditions work better with different types of teeth and tooth patterns on the chain. I advise having three or maybe four chains loaded for different situations. It can take a couple hours to change all the teeth on a chain, but it only takes a few minutes to change a complete chain if digging conditions change or you move to a new site.

All the manufacturers supply their trenchers with a complete set of teeth known as cup teeth. These are good for general easy digging and general utility use, but for production in extreme or special conditions there are better ways to do it. Cup teeth must be very sharp to get good production. The cutting action is actually at the tip of the tooth. This tip wears off rapidly, especially in abrasive soil. I find it faster and cheaper to build the teeth up with an arc welder rather than to replace them. The body of the tooth is built up with regular welding rod and then the hard facing is placed over this. **Caution: If you do this while the chain is on the machine, be sure to disconnect the alternator and voltage regulator or you may blow out their solid state components.**

I keep two chains loaded with cup teeth. One has worn to the extent that the points are rounded off and the chain is actually dull. I use this when working near other services, keeping the trencher motor at low speed. The production is not good, but if I accidentally hit a pipe or conduit there will be only minor or no damage. This is the only place I use this chain.



TEETH AND HOLDERS FOR

Ditch Witch K2,K3,J20,V30 & R40

(using 2" pitch standard* chain)

*For machines equipped with frost chain having twice as many stations as the standard chain, double the quantities shown for each item in the PENGGO package.

COMPONENT & REPLACEMENT PARTS for quantities included in each package read across		
code no	part number	approx wt lbs
teeth holders	78120 WC-23 Bottom	2.0
	78170 WL-23 L.H. Side	2.6
	78180 WR-23 R.H. Side	2.6
	72040 5T30 Super	.4
spacers	72020 35 Wisdom	.4
	74665 A1 Tube $\frac{1}{2}$ "x $\frac{1}{4}$ " lg	.1
	74676 B9 Tube $\frac{1}{2}$ "x $\frac{1}{4}$ " lg	.2
	74671 BF1 Tube $\frac{1}{2}$ "x $\frac{1}{4}$ " lg	.2
brackets and holder brackets	74680 C1 Tube $\frac{1}{2}$ "x $\frac{1}{4}$ " lg	.3
	74675 D2 Tube $\frac{1}{2}$ "x $\frac{1}{4}$ " lg	.2
	74600 F3 Flat	.3
	75170 BR-9-23 Bracket	4.5
bolts and nuts	75180 BR-11-23 Bracket	6.0
	75190 BR-13-23 Bracket	8.0
	773330 HB-15-23 Holder Bracket	14.0
	773335 HB-17-23 Holder Bracket	16.0
	74445 $\frac{1}{2}$ "x3" lg	.2
	74447 $\frac{1}{2}$ "x3 $\frac{1}{2}$ " lg	.2
	74495 $\frac{1}{2}$ "x3 $\frac{1}{2}$ " lg	.3
	74451 $\frac{1}{2}$ "x5" lg	.4
	74405 $\frac{1}{2}$ "x7" lg	.6
	74310 $\frac{1}{2}$ "x8 $\frac{1}{2}$ " lg	.7
	74311 $\frac{1}{2}$ "x10 $\frac{1}{2}$ " lg	.9
	74312 $\frac{1}{2}$ "x12 $\frac{1}{2}$ " lg	1.1
	74313 $\frac{1}{2}$ "x14 $\frac{1}{2}$ " lg	1.3
	74314 $\frac{1}{2}$ "x16 $\frac{1}{2}$ " lg	1.5
	74510 $\frac{1}{2}$ " Lock Nuts	.1

TOOTH OPTIONS AND ACCESSORIES		
code no	part number	wt lbs
72015	1336 Tungsten Carbide Tooth**	4
72020	35 Wisdom Tooth, box of 50	18.0
72040	5T30 Super Tooth, box of 50	18.0
37600	Rubr-Lok, 4" lg*	.1
37730	WTH-50 Hammer	4.4
37750	1225 Drill Punch	8

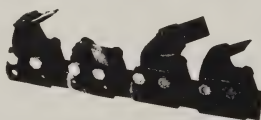
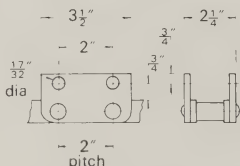
*Two 4" lengths included in each box of 50 teeth.
**See page K-8

PACKAGE DATA (Chain not included) for package quantities and package code number, read down																			
18 stations (42" boom)										24 stations (64" boom)					27 stations (78" boom)				
6"	8"	10"	width 12"	14"	16"	18"	6"	8"	10"	12"	width 14"	16"	18"	20"	24"	32"	6"	8"	width 10"
14	14	15	21	22	22	22	18	18	20	28	19	19	19	19	19	19	19	19	19
2	2	3	3	2	2	2	3	3	4	4	4	4	4	4	4	4	4	4	4
2	2	3	3	2	2	2	3	3	4	4	4	4	4	4	4	4	4	4	4
2	2	3	3	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4
16	16	18	24	24	28	36	20	20	24	32	24	24	24	24	24	24	24	24	24
8	8	12	12	8	8	8	16	16	16	16	16	16	16	16	16	16	16	16	16
12	—	—	—	—	—	—	12	—	—	—	—	—	—	—	—	—	16	—	—
8	—	—	—	—	—	—	12	—	—	—	—	—	—	—	—	—	16	—	—
12	32	18	14	12	4	—	16	40	26	16	16	16	16	16	16	16	16	16	16
—	12	20	12	8	8	—	—	12	28	16	—	—	—	—	—	—	16	—	—
4	4	—	—	—	—	—	6	6	—	—	—	—	—	—	—	—	8	8	8
—	—	2	4	2	2	2	—	—	2	6	—	—	—	—	—	—	—	—	—
—	—	—	3	4	2	2	—	—	—	4	—	—	—	—	—	—	—	—	—
—	—	—	—	2	4	2	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	2	4	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—
24	4	6	6	4	4	4	32	8	8	8	38	6	6	6	6	6	6	6	6
12	12	8	8	8	—	—	16	16	12	8	16	16	16	16	16	16	16	16	16
—	—	—	—	—	—	—	—	12	—	—	—	—	—	—	—	—	—	—	—
—	—	12	—	—	—	—	—	12	—	—	—	—	—	—	—	—	—	—	—
—	—	—	10	6	4	4	—	—	14	8	—	—	—	—	—	—	—	—	—
—	—	4	8	4	4	4	—	—	4	12	—	—	—	—	—	—	—	—	—
—	—	—	6	8	4	4	—	—	—	8	—	—	—	—	—	—	—	—	—
—	—	—	—	4	8	4	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	4	8	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	4	8	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
36	36	28	34	32	28	28	48	48	38	44	54	54	54	54	54	54	54	54	54
54	82	88	132	139	173	220	71	109	116	178	71	109	109	116	178	71	109	109	109

approx
package
code no

Design subject to change without notice

RECOMMENDED SEQUENCES FOR Ditch Witch K2,K3,J20,V30 & R40



for detailed holder dimensions
see PENGGO Bulletin 78-TR

STANDARD CHAIN 18 STATIONS (42" BOOM)																	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
6" Wide	C	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R
8" Wide	C	7L	7R	L	R	L	R	L	R	L	R	L	R	L	R	L	R
10" Wide	C	L	R	7	—	10S	C	7	—	9	—	10S	C	L	R	9	—
12" Wide	7	L	R	11	C	12S	7	9	—	11	C	12S	7	L	R	11	C
14" Wide	C	L	R	7	9	11	13	—	14S	C	L	R	7	9	11	13	—
16" Wide	C	15	—	7	9	11	13	—	16S	C	15	—	7	9	11	13	—
18" Wide	C	15	—	17	9	11	13	—	18S	C	15	—	17	9	11	13	—

note: these sequences not recommended
beyond trenching machine manufacturer's
depth-width specifications

FROST CHAIN
36 STATIONS (42" BOOM) — Repeat above sequences for stations 19-36

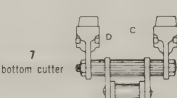
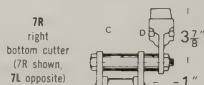
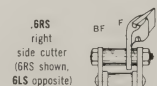
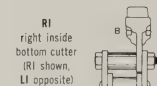
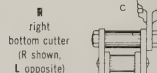
STANDARD CHAIN 24 STATIONS (64" BOOM)																								← DIRECTION OF TRAVEL	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
6" Wide	C	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R
8" Wide	C	7L	7R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R
10" Wide	C	L	R	7	—	10S	C	7	—	9	—	10S	C	L	R	9	—	10S	C	L	R	7	—	10S	C
12" Wide	7	L	R	11	C	12S	7	9	—	11	C	12S	7	L	R	11	C	12S	7	9	—	11	C	12S	7

FROST CHAIN
48 STATIONS (64" BOOM) — Repeat above sequences for stations 25-48

STANDARD CHAIN 27 STATIONS (78" BOOM)																											
													DIRECTION OF TRAVEL														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
6" Wide	C	L	R	L	R	L	R	L	R	L	R	L	R	L	R	C	L	R	L	R	L	R	L	R	L	R	L
8" Wide	C	7L	7R	L	R	L	R	L	R	L	R	L	R	L	R	C	7L	7R	L	R	L	R	L	R	7L	7R	L

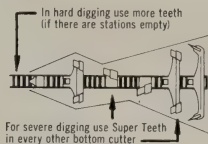
FROST CHAIN
54 STATIONS (78" BOOM) — Repeat above sequences for stations 28-54

Cutter Positions W-23 Series





**FOLLOW MACHINE
MANUFACTURER'S
RECOMMENDATIONS**



CUTTER DATA CHART						
cutter position	cuts	Required Components				
		holders	qty teeth	spacers	brackets	bolts/nuts
C	1 1/4"	(1) WC-23	1	(4) A1	—	(2) 1/2"x3"
L	4 1/4"	(1) WC-23	1	(2) C1	—	(2) 1/2"x3 1/4"
R	4 1/4"	(1) WC-23	1	(2) C1	—	(2) 1/2"x3 1/4"
LI	3 1/4"	(1) WC-23	1	(2) B9	—	(2) 1/2"x3"
RI	3 1/4"	(1) WC-23	1	(2) B9	—	(2) 1/2"x3"
6LS	6"	(1) WL-23	1	(2) BF1	—	(2) 1/2"x3"
6RS	6"	(1) WR-23	1	(2) BF1	—	(2) 1/2"x3"
7L	7"	(1) WC-23	1	(2) C1	—	(2) 1/2"x5"
7R	7"	(1) WC-23	1	(2) D2	—	(2) 1/2"x5"
7	7"	(2) WC-23	2	(2) C1	—	(2) 1/2"x7"
8LS	8 1/4"	(1) WL-23	1	(2) C1	—	(2) 1/2"x3 3/4"
8RS	8 1/4"	(1) WR-23	1	(2) C1	—	(2) 1/2"x3 3/4"
9	9"	(2) WC-23	2	(1) F3	—	(2) 1/2"x8 1/4"
10S	10 1/4"	(1) WL-23	2	(2) C1	(1) BR-9-23 75170	(2) 1/2"x8 1/4"
11	11"	(1) WR-23	2	(4) D2	—	(2) 1/2"x7"
12S	12 1/4"	(2) WC-23	2	—	(1) BR-11-23 75180	(2) 1/2"x10 1/4"
13	13"	(1) WL-23	2	—	(1) BR-9-23 75170	(2) 1/2"x8 1/4"
14S	14 1/4"	(2) WC-23	2	—	(1) BR-13-23 75190	(2) 1/2"x12"
15	15"	(1) WL-23	2	—	(1) BR-11-23 75180	(2) 1/2"x10 1/4"
16S	16 1/4"	(2) WC-23	4	—	(1) HB-15-23 773330	(2) 1/2"x14 1/4"
17	17"	(1) WL-23	2	—	(1) BR-13-23 75190	(2) 1/2"x12 1/4"
18S	18 1/4"	(2) WR-23	4	—	(1) HB-17-23 773335	(2) 1/2"x16 1/4"
18S	18 1/4"	(2) WC-23	4	—	(1) HB-15-23 773330	(2) 1/2"x14 1/4"



35 dirt tooth; code 72020. Sold in 50-tooth pkg; shipping wt: 18 lb (8 kg). For ordinary digging and loose sandy soil. Thin cross section for best penetration. Wears sharp. Used in all pockets except "C" (center bottom).

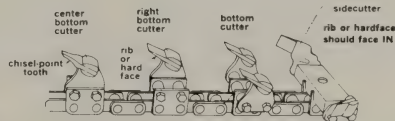
35-HFC hardfaced 1-side dirt tooth; code 78452. Sold in loose lots; unit wt: 6 oz (.2 kg). For abrasive soil, hard digging. Install with hardfacing toward the chain.

35-HFFC hardfaced 2-sides dirt tooth; code 78453. Sold in loose lots; unit wt: 6 oz (.2 kg). For long wear in abrasive soil.

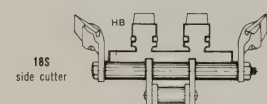
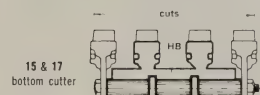
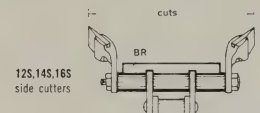
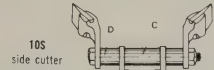
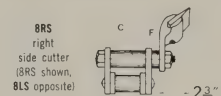
5T30 chisel-point tooth; code 72040. Sold in 50-tooth pkg; shipping wt: 18 lb (8 kg). For ripping action while digging in caliche, hardpan, sandstone. For installation in "C" (center bottom) holder. In extra hard digging, this tooth may be installed in every-other bottom cutter. Never use chisel-point teeth in the sidecutter holder.

5T30-HFC hardfaced chisel-point tooth; code 78465. Sold in loose lots; unit wt: 6 oz (.2 kg). For extremely abrasive soil and frozen ground. Use in all cutter positions.

1336 tungsten carbide tooth; code 72015. Sold in loose lots; unit wt: 6 oz (.2 kg). For extremely abrasive soil and frozen ground. Use in all cutter positions.



**TEETH IN BOTTOM CUTTERS
SHOULD BE INSTALLED WITH
RIB OR HARDFACE TOWARD CHAIN.**



Quick-change teeth with RUBR-LOK



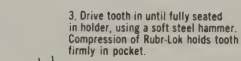
Remove worn teeth by driving out with a drift punch. Replace Rubr-Lok only if damaged.



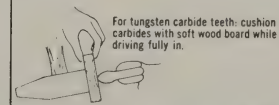
1. Cut Rubr-Lok as long as the tooth is wide at tangs.



2. Insert Rubr-Lok evenly in holder. (If tooth is difficult to install, dip Rubr-Lok in water; NEVER use grease or oil.)



3. Drive tooth in until fully seated in holder, using a soft steel hammer. Compression of Rubr-Lok holds tooth firmly in pocket.



For tungsten carbide teeth: cushion carbides with soft wood board while driving fully in.

*US PAT. 2,968,880

I use a fully loaded cup tooth chain that I keep sharp for cutting through large tree roots, buried scrap lumber (It's amazing how much of this there is around some building sites) and in sandy or very soft soil. The cup teeth are very efficient in removing the spoil.

For extremely hard digging I use a chain that is fully loaded with Pengo® teeth. (See partial specification sheet.) These teeth are extremely hard and shaped to chisel through hardpan and will even cut soft rocks like some types of sandstone. The way they are mounted it only takes about ten seconds to change a tooth if one gets dull or if you break one.

For general digging in hard soil I use a combination loading where I put Pengo® teeth on the bottom cuts of the chain, but use cup teeth for the side cut. This method makes a little faster spoil removal and does not require as much power for normal use. The method of loading is as follows:

- Station 1 Pengo center bottom cutter
- Station 2 Pengo right bottom cutter
- Station 3 Pengo left bottom cutter
- Station 4 Cup, right side cut
- Station 5 Cup, left side cut

Then repeat this pattern all the way around the chain. I use this loading for probably 80% of our trenching.

Caution: Do not even think of using Pengo teeth when working near other services. They have only to get close to something to snag it and tear it all to pieces.

Also, do not attempt to trench through large tree roots with them. They will dig into a big root and stall the trencher. Then you **will** dig it out by hand and cut the root with an axe. This is darn difficult to

do under the trencher. You will probably make this mistake only once.

There may be other manufacturers of similar kits in other parts of the country, that I have not heard of. If so, I would like to hear of them so we can mention their names in future articles. Pengo is near my office and I am familiar with their very fine products. You can get a copy of their complete specifications sheet for your model trencher by writing to them at:

Pengo Corporation
Box 950
Sunnyvale, Ca. 94088
Attn: Don Dettman

Or telephone him at 408-739-8040. He will also give you the name of their dealer nearest you.

When there are large rocks in the soil, it is helpful to run a skip tooth pattern. You leave a tooth off the chain, then follow this space with a center cut Pengo® Super Tooth. This allows the chain to fall around the rock so the following tooth can hook under it and pull it out rather than just chattering over it.

After getting your machine set up and starting to trench, the best approach is usually fairly obvious. You will find that when possible, it is best to throw the spoil to the downhill side of the trench and that it is easier to trench going downhill even if it is a gentle slope.

When making branch trenches always plan your trenching sequence so that you throw the spoil away from an already dug trench. This way you don't have to do a lot of hand work. If you cross trenches, lay down a piece of plywood (reel ends work well for this) so that you do not fill much of the other trench when you dig over it.

Happy digging.

Letters To The Editor...

Dear CATJ,

Am I surprised? Every month I faithfully watch for my CATJ to arrive with helpful tips and information. The rest of the month I'm telling and showing my colleagues how fantastic CATJ is to the technician.

To my surprise on the cover this month, low and behold there he is in full life—the "typical technician"—no hard hat, no safety belt, and no traffic cones. The next time my supervisor gets down my back about safety and accident prevention, I'm going to whip out the February '80 issue of the OFFICIAL JOURNAL OF THE COMMUNITY ANTENNA TELEVISION ASSOCIATION and show him the cover. It's good to know I'm not alone!!

As past safety director of my system (after a fall and broken ankle), I think it would be appropriate to see more technical information on safety features in cable publications.

Thank you for such a terrific and informative publication; it's the spice of cable TV.

Sincerely,
Harold W. Walter

Dear Mr. Walter:

You are absolutely correct!!! Those safety measures should definitely be used and the cover should have

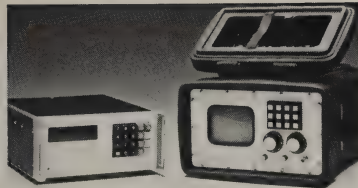
included them. In defense, we simulated this picture to accompany our article on the construction of that piece of equipment, and the tech climbed the ladder for illustrative purposes, so it was not a real working situation when the picture was taken. But we would definitely want to encourage all to see to it that your techs implement safety precautions as they are working; **safety is smarter!!!** The time it takes to employ safety measures is nothing compared to time lost in case of an accident, not to mention bodily harm and dollars lost. As you suggest, an article on technical information concerning safety features would be a good one—what do the rest of the readers think?

Editor:

Sincere congratulations on the great courage behind your pen, in the "CATA-TORIAL", of your January 1980, edition of CATJ.

On behalf of the handful, or so, of our members, who aspire to invest their time, effort and dollars in the U.S., we are most grateful for the frank clarification you have given to the problem. Obviously, we find it rather difficult to address on our own behalf, other than to say that our

Continued on Page 20



Introducing Wavetek's 400MHz Sweep Recovery System.

While you're putting shows on those new channels for your subscribers, our new Model 1855/1865A Sweep Recovery System will

be putting on quite a show for you. It sweeps and analyzes all the way from 1 to 400 MHz and provides alphanumeric readouts on the screen for amplitude and frequency. Meanwhile the viewer's screen stays sharp and uninterrupted, thanks to our high-speed sweep (down to 1 millisecond). At the same time, the picture on your 1865A stays sharp and uninterrupted because it's continuously refreshed. And memory access is now standard equipment. So reruns are instantly available.

Directing this brilliant performance is our microprocessor

control. It even takes care of most of the setup procedure that used to take so long.

Of course, the star of any Wavetek show is the price. In this case, just \$7,150 for the 1 to 400 MHz Model 1855/1865A. But if all you need is the 350 MHz version, you can knock off \$700. To get the complete picture, just write or call: Wavetek Indiana, P.O. Box 190, 66 North First Avenue, Beech Grove, IN 46107. Toll-free 800-428-4424. In Indiana, phone (317) 783-3221.

WAVETEK®



When your subscribers have 52 channels to watch, so will you.

country has always benefited greatly from many years of rather gigantic American investment of dollars and expertise in Canada. Although our cable endeavors in the U.S. are insignificant by comparison, it would appear as though our people should be granted freedom to make their contribution towards the fulfillment of a market need, without prejudice.

Another point I feel compelled to make is that there is a great need to review the differentiation between "foreigners" and "neighbours". I suggest that any time we fall into the trap of treating our neighbours as

foreigners we run the risk of being consumed by the "real foreigners" of the world.

Finally Ben, if the courage of your conviction on our behalf, precipitates the wrath of the wasps upon your head, we will be pleased to help you get out of the country and on friendlier ground. We're gaining quite a bit of expertise at that as well these days, you know.

Charles V. Keating
Chairman
Canadian Cable Television Association

Readers:

The following letter is an excellent example of the type of letter that is effective on Capitol Hill, and we reprint it with the hope that it might be a stimulus to the CATJ readers to keep in touch with your congressional delegation in Washington. We commend Mr. Roth for his sensitive approach in contacting his Senator with this type information, and appreciate his permission for reprinting. We understand that the letter was not only furnished to Senator Hatfield, but Mr. Roth also sent copies to the Copyright Tribunal and the Copyright Office. He says it all—maybe you have something you would like to say too!

Senator Mark O. Hatfield
463 Russell Senate Office Building
Washington, D.C. 20510

Dear Senator Hatfield:

My wife and I are partners in the operation of a small 140 subscriber cable television company that serves the town of Tygh Valley in Wasco County. We installed the system in 1978 at the request of the community, which up to that time had very poor reception of both radio and television signals. I borrowed \$30,000 against my name to put this service in and have also invested several thousand hours of my own time without pay during my time off from a full-time job with the Juvenile Court of Wasco County. My father, Dick Roth, has operated small cable TV systems for more than 25 years; I learned the business from him.

For the first half of the above-mentioned 25 years, everyone seemed grateful that small cable TV operators would work to provide service to the small communities which would otherwise be isolated from access to the electronic media. Broadcasters were happy for the extended coverage. The people were happy to get the service. Government regulators didn't care.

All this changed when large corporations began to realize there was much money to be made in wiring up the urban areas with cable TV. Broadcasters got nervous and government regulators went to work. Unfortunately, the Congress and the regulators could never seem to differentiate between an urban cable TV system which strung their cables among the shadows of the broadcasters transmitting towers and rural TV systems which were their

subscribers' only connection to TV and FM radio service.

I realize that the Congress and the FCC have backed off a lot in the last few years, but I still have to file four or five reports (some very detailed) every year for the FCC and two reports every year for the copyright office. If I fail to do this, I am subject to fines that far exceed the net worth of my cable TV system. The reports and the whole system are very obviously designed for the large systems which serve thousands of customers in the urban areas.

I agree that large corporations need regulation, but the regulation of cable television should not be keyed to the size of a system but to where it operates. If a system operates in an area which is not served by broadcasters or relay stations operated by them, then no regulation is needed or should be applied. Systems operating in those two different areas are different creatures which operate for different purposes.

Regarding Copyright: the "secondary transmission" principle is a form of insanity. A cable system by nature cannot select the individual programs it carries without sophisticated switching equipment which is far beyond the financial grasp of rural cable systems. It either carries a broadcast signal or it does not.

It is a lot like a paperboy who brings the newspaper. Should a paperboy pay the newspaper and the columnists that appear in the paper a fee for delivering the paper? Is he a "secondary publisher?" If a cable TV system begins to act like a publisher or broadcaster and originates their own programming, then the system should negotiate with the copyright holders directly. The present copyright law is wrong because it doesn't recognize the function of cable television and because it puts the government, of all things, in charge of collecting profits for private entrepreneurs.

The procedures for reporting copyright are burdensome and in some instances inexplicable. For instance: in the Tygh Valley situation, FM radio signals are received "broadband". That is, an FM antenna is pointed toward Portland and all the signals are relayed at once to the customer, as is. Some are clear, others fair, some are poor (noisy). Some are good some days and bad on others. But the important point is that we extend the Tygh Valley subscribers

antenna, as it were, to the top of Tygh Ridge as if his house were up there and he is grateful for this selection of stations where none was available before. In spite of the antenna being pointed at Portland, the mountains seem to reflect FM radio signals from Bend, Albany, Salem, The Dalles and even Pasco, Washington. The copyright people demand that we sit down at our antenna site and try to log all these stations at regular intervals and send them a list every six months with notations of the type of monitoring equipment we used and the dates and times the monitoring took place. This literally takes hours and hours of work. Many FM stations identify themselves irregularly since the FCC rules were relaxed on station identifications. Many stations identify with buzz phrases which are hard to decode: "K-happy, K-101, etc." The stations seem to change their call letters all the time too. Requiring us to monitor at the antenna site imposes further difficulties for us and makes no technical sense. Our antenna site is on Tygh Ridge—a place of limited accessibility (I have to hike in four months of the year) and disagreeable weather conditions. These people, plainly, do not know what they are asking . . . and for a system of this size that pays \$15.00 twice per year, does it make any difference? I would be pleased to invite someone from the copyright office and the congressional committee that thought up all this to come out to Tygh Valley and assist in logging all the stations for one of the semi-annual reports!

If I took the easy way out, I could either turn off the FM service or put two or three stations on instead of using the broadband approach. By processing the signals individually it is more expensive, so only a few stations could be offered. But, the whole idea is to extend the subscribers antenna to the mountain top and give him what is there.

I have viewed myself as being a rather liberal, fair-minded person reasonably tolerant of government activities. I guess I got that way graduating in social sciences from OSU and working in the social service profession. But, getting the enclosed letter from copyright about a problem with the FM matter just described above, getting the long-form census sheet today, just finishing the FCC form 326 (financial data report . . .

Continued on Page 22

"Together, we're making cable television a household word"

— Ted Turner

At Turner Broadcasting, our priority is cable. We don't just supply the industry, we're part of it. We are proud to have pioneered new sources of program delivery for the cable industry. Thanks to your support, we've been able to build an organization that understands your needs and provides you with the best fundamental choices in basic programming.

Turner Broadcasting gives the people the kind of programming you should be carrying—good, basic programming on the SuperStation and Cable News Network. The kind of programming that's fundamental to cable.

By working together, we've put WTBS in over 6,500,000 American homes. Our objective for WTBS has been to provide your subscribers with the family entertainment they wanted from cable. Response from operators and viewers shows we're on the right track, twenty-four hours a day.

For every nickel we gain, the more Turner Broadcasting puts back into new cable programming. Now, we're about to bring you the Cable News Network... the most ambitious project ever undertaken in the history of broadcast journalism. We've committed \$100,000,000 to it so you can give your subscribers the most innovative development in television news today. And we're making our programming for your subscribers... exclusively cable.

Working together over the past five years, we've become quite a team. I was honored to stand along with the NCTA and CATA before Washington testifying on behalf of the cable industry, against "re-transmission consent" as well as other issues. As the only broadcaster speaking out for cable to both the House and Senate Subcommittees, I know the intensity of some of the problems. But, we've faced them together... and just look how far we've come. At the same time, our joint efforts have beaten back the attempts of the entrenched broadcasting establishment to hinder cable's ability to provide the Ameri-

can public the benefits of expanded programming options that cable offers.

Speaking for all of Turner Broadcasting, I would like to thank each of you who are presently carrying WTBS and have committed your system to the Cable News Network. To those who have not yet included these two basic services we want to urge you to get to know how important they are to cable's growth and profitability.

So we can mutually benefit in cable's tomorrow, today.



WTBS THE SUPERSTATION AND CABLE NEWS NETWORK.
THEY'RE WORLDS APART FROM ALL THE OTHERS.



*Letters To The Editor –
Continued from Page 20*

our financial statement wasn't enough or right ... it had to be broken down their way), just getting ready to file my 16 page income tax return which cost me \$320 in accounting fees and on which I still owe \$1200 tax (the federal government gets the cash out of my cable TV system and my accountant says I get the equity ... have you tried eating equity?) .

... all of this tends to push one to the right politically and brings to mind some of Jefferson's remarks about oppressive government in the Declaration of Independence. I am fed up. I am through voting for people who can't follow through with a positive commitment to dismantle this insanity. I wrote to you since I think you best represent the

Wayne Morse tradition of independent thinking and a willingness to take stands on issues which effect individual freedom. Please help.

Very truly yours,
James F. Roth
Cascade Cable Systems
The Dalles, Oregon

More Management...

CABLE BILLING

MORE MANAGEMENT!!!!

Patricia Jolly, Indian River Cablevision, Sebastian, Florida, was another of the lady panelists that appeared at CCOS-79 to discuss office procedures and management practices. In the March issue, we presented one method of billing done at TVIQ in Eagle Grove, Iowa. Below is the method used by the two systems where Ms. Jolly is the Office Manager; we wanted to add her comments and methods to those already presented.

There are two types of billing procedures used which I would like to discuss. The smaller system we manage uses **coupon billing**; these are set up on an account number basis for a one-year period. We find this method is most successful as it does not require a great deal of office expense, such as labor, copying time, or postage.

In our larger system, which is comprised mostly of a transient group of customers attracted to Florida, it is necessary that we use a different method. Using a master card, 8 1/2" x 5 1/4", this has the complete information with the customer's name, address, account number, location, and number of outlets, and is of the size that it can be folded to fit a window envelope, eliminating the duplicating of addressing. Billing is done on a two-month

basis, in advance; billing is done by splitting the alphabet in half enabling us to bill **half** of the customers each month, but for the two-month period.

Each card is marked with the date the billing is sent, the two month period for which the customer is paying, and any additional charges that might have been incurred since the previous billing. A line is saved to show the date the customer last paid, the amount, and if any balance is due. A copy of this is made to be mailed out. Pre-sorted postage envelopes give us the advantage of cutting our mailing costs.

In regard to our Pay TV Package, this billing is done **monthly**. Another master card is used for this billing which shows the customer the basic cable charge, but also the Pay TV charge, plus his deposit that is required prior to installing the equipment necessary to receive the pay channels.

For delinquent notices, our basic cable customers are allowed thirty days before a postcard type reminder is sent, allowing an additional ten days to clear the account before interrupting their service. A date chart indicates which customers are due for disconnects, and when that time is accomplished, disconnect orders are written and their cable service is turned off. To have their service re-connected, the outstanding balance, **plus a re-connect charge**, must be paid prior to a work-order to re-connect their service.

On the Pay TV service customers, the billing is sent on the 15th of the

month for the proceeding month's programming, which gives the customer ample time to receive programming information (TV GUIDE, etc.) on the next month's programs. They are given twenty days on this billing, then a reminder is sent, and if no payment has been received after ten days, they are immediately disconnected. Responsibility for the Pay TV Package is a big one, as it is necessary to keep an accurate record, not only of their payments, but of the converters that have been installed in their homes.

There are some cable and cable/Pay TV customers that appreciate the opportunity to pay their rate on a yearly basis. In this instance, they actually pay for eleven months' service, but are afforded the discount of receiving another free.

Because of the transient nature of many (about 45%) of our customers who habitat Florida during the winter months and then vacate in the spring, custom arrangements are made as far as breaking our month into thirds, allowing these subscribers a small break in their charge. In this instance, we do not charge them to disconnect as they leave in the springtime, but there is a charge for re-connecting when they return for the next winter.

It seems that there are situations in every locale that makes for a particular method adaptable to those situations. Perhaps the methods above may be of assistance as you plan your office procedures. If there are questions, submit them to the Editor, and we will be happy to assist you.

A LITTLE DIFFERENT KIND OF PRODUCT REVIEW

Ye Compleat TRAPPER — Microwave Filter's new approach to updating their catalog, containing over thirty different filter and trap types. The **C/80**, as the Microwave Filter catalog is named, has 35 varieties of filters/traps, and is geared for use by CATV, MATV, CCTV Operators, as well as 50 ohm Communicators, listing devices for INTERFERENCE SUPPRESSION, CHANNEL DELETION & DETOUR, CCTV INSERTION, BANDSPLITTING & COMBINATION, CO-CHANNEL & GHOSTING, PAY TV, and 0-890 MHz, and contains World Channel Allocations.

The interesting thing about this catalog is that the MF customers have literally written it with their requests and requirements, with compilation under the editorship of MFC's Chief Engineer, Glyn Bostick, certainly one of the leaders in the cable industry. Glyn and Emily Bostick, (Vice President in charge of Technical Marketing) encourage the readers of the **C/80** to contact them if they cannot locate their particular needs within the pages of the new edition. They promise to quote specs, prices and delivery usually during the first phone call, but within 24 hours at the very latest. But the best part, and certainly a consideration with the extended delivery dates these days, nothing in the **C/80** has been put in if delivery cannot be made within **two weeks** or less. If you should have a special, it might take a little longer, but they will attempt to modify a **C/80** product and deliver quickly.

Catalog C/80
Price \$1.00

FILTERS & TRAPS FOR CABLE TV

Available in American & World Wide Channels

For CATV • MATV • CCTV Operators
and 50 ohm Communicators

Devices for INTERFERENCE SUPPRESSION
CHANNEL DELETION & DETOUR
CCTV INSERTION
BANDSPLITTING & COMBINATION
CO-CHANNEL & GHOSTING
PAY TV
0-890 MHz

Contains World Channel Allocations



Ye Compleat TRAPPER

The catalog is a complete handbook — giving complete specifications, descriptions, and applications, and yes, other information where it is called for, such as channels available, etc. We would like to recommend that the **ONE DOLLAR** charged for this catalog will be the cheapest technical aid that you can find — get in touch with Emily Bostick, MICROWAVE FILTER COMPANY, INC., 6743 Kinne Street, East Syracuse, New York 13057, to order yours, or call her at their toll-free number, 800-448-1666. We feel this handbook can be a valuable assist and provide good service to the operators who use it.

400 MHz



The New Model 7272:
400 MHz coverage in 6 bands. The most complete and versatile signal level meter in the industry.

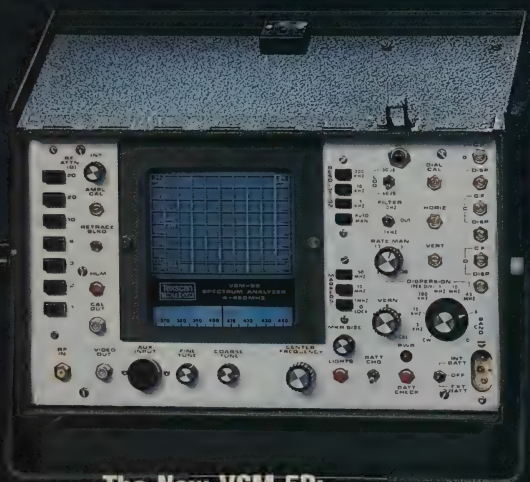
The New 9551 T & R:
Sweep tests to 450 MHz with minimal subscriber interference.

The New TFC-7A:
Tuned frequency counter, developed specifically for CATV. System proof of performance measurements to 54 channels.

IT'S TIME TO MAKE THE CHANGE TO 400MHz TESTING EQUIPMENT . . .

U.S.A.
Tevscan Corporation
2046 N. Shidoland
Indianapolis, Indiana 46219
(317) 357-8761

MORE THAN EVER BEFORE . . . WE'RE READY TO SERVE YOU



The New VSM-5B:

The industry standard portable spectrum analyzer — now to 450 MHz.

The New VSM-1A

Displays a video carrier profile of the total frequency spectrum from 4 to 450 MHz — providing fast and accurate analysis of CATV system problems.

The New 9900D:

Sweep test cables, amplifiers and passives now to 450 MHz — and it's portable.



AND WE'RE READY.

Texscan

U.K.
Texscan CATV
1 Northbridge Road
Berkhamsted, Hertfordshire,
England UK
04427 71138

DEUTSCHLAND
Texscan GMBH
8 München 90
Schliersee-Strasse 31A
West Germany
0811/69 5421

Distributed in Canada by Comm-Plex Electronics

I am ready
for more information
on your new line of
400 MHz CATV test equipment.
Please send me your new catalog and price sheets.

NAME: _____
 COMPANY: _____
 CITY: _____ STATE: _____ ZIP: _____
 AREA CODE: _____ TELEPHONE: _____ EX: _____

SEND TO: Raleigh Stelle, Texscan Corporation, 2446 N. Shadeland Ave. Indianapolis, Indiana 46219

But just what is the **C/80**? Microwave Filter Company has updated their older CATV filter/-trap catalog in the form of **C/80** and as we said above, it contains over 30 different filter and trap types. Specifications for each type are accompanied by physical dimensions, mounting options (indoor or outdoor), recommended applications and original spectrum analyzer traces of electrical performance.

C/80 is divided into five broad categories:

1. **BANDPASS FILTERS** (sub-band thru UHF)

Varieties include top of the line adjacent cut-off BPF, low-loss semi-adjacent suppressing BPF, small, low cost outdoor BPF, very narrowband and very wide-band BPF. Special BPF for the FM and sub-bands are included, as is a line of UHF BPF.

2. **GENERAL PURPOSE TRAPS**

These include traps to eliminate interference from adjacent channels, close-in off-air offenders and

from mobile radio including CB transmitters.

3. **SPECIAL PURPOSE FILTER NETWORKS**

Included here are filter networks designed for specific tasks: co-channel elimination, full channel spectrum suppressors, networks for descrambling entire buildings and for vacating off-air channels for CCTV insertion.

4. **PAY TV - Traps & Filters**

Video traps for all 35 channels are described, as well as multi-channel traps for the mid-band (2 to 7 channels). Engineering data includes a graph for relating system drop level to notch suppression required. A switchable parental control trap is described as well as a line of filters for implementing "pay only" programs.

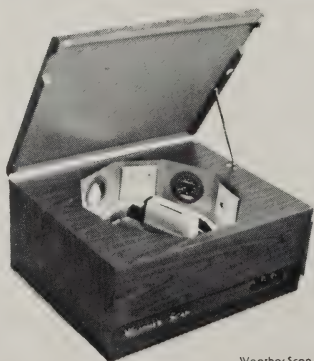
5. **INFORMATION**

Channel frequency allocations, including FM are given for Canadian/U.S. channels and specific allocations and designations

in other parts of the world. Included is in-channel carrier locations, including this same information for inverted channels.

The **C/80** is more than merely a catalog of filters — it's a bona fide handbook for systematically solving almost any CATV operating problem, where the use of filters is indicated. This is the result of Microwave Filter's specializing in filters for the CATV industry, where 40% of their work is "specials" or "original design". In this full update, this catalog reflects the many special products originated by MFC for specific operators and then standardized. The first effort resulted from a survey of filter-related CATV problems and a design effort to provide a product for each of these problems. But over the intervening years, cable growth has stimulated a host of new problems, and the new issue, **C/80**, is the result of a continuous pre-occupation with operator problems gathered during those years.

First In Reliability



Weather Scan III

Impressive quality . . . surprisingly low price. Just \$3295 for the most reliable unit available (any any price!).

We have been in the cable television business for 23 years . . . and providing weather information systems for the past 16 years. We know what you need and we know how to manufacture it. For reliability and performance.

The Weather Scan III comes complete with Sony AVC-1400 camera with separate mesh vidicon and 2:1 interlace sync. Includes Time, Temperature, Barometric Pressure, Wind Velocity, Wind Direction, plus four card holders. Compact cabinet is just 28" wide, 23" deep and 14" high. For complete information call or write.



Weather Scan, Inc.

[An R.J. Tyler Enterprise]

Loop 132 and Throckmorton Hwy. Olney, Texas 76374 Ph. 817-564-5688

DATA COMMUNICATIONS IN CABLE TELEVISION SYSTEMS

by Bruce W. Robertson
President, Computer Video Systems, Inc.

Since cable systems are becoming, and will become, more involved with digital data handling for communication, control, and display, a basic discussion of modes, methods and meaning should help to better understand digital data communications. This article is not intended as an in-depth study of digital communication systems, but rather as a discussion of the most common forms of data communication encountered in a cable T.V. system and terms used to describe them.

Digital data can be defined as **"information represented by a code consisting of a sequence of discrete elements."** Let's break it down into a sequence or time related series of two conditions where one condition represents a 1 (one) in binary code and the other condition represents a 0 (zero) in binary code. Thus the code or information can be represented by a series of time related ones and zeros. The chart in **Figure 1** shows the translation of codes as represented by the 1 (one) and 0 (zero) states in the three most commonly encountered codes.

Most of the incoming digital data for display on cable is **"serial transmission"** which essentially means it arrives at the system one bit at a time. Where the word "bit" represents the data element and whether the bit is a 1 (one) or 0 (zero) during that time, represents the specific information of that bit.

The terminology used to describe the form on which data is transmitted consists of a few key phrases with which you should become familiar: **THOSE CHARACTERS—BIT, BAUD, AND BYTE**

A **bit** is the smallest element of information in a digital code. **Figure One** shows that the ASCII code contains 8 bits to form a character and is referred to as an 8 level code. In the 5 level baudot

code, only 5 bits are required to make a character, etc. The 5 level baudot code is restrictive in that only 2^5 or 32 discrete characters can be formed from this code; therefore, in order to display the alphabet, numbers, and some punctuation, a condition code referred to as "letter shift" or "figure shift" is used. The receiver or decoder for this code must then have the ability to store these two codes and interpret all of the data received after that code in one state or the other. If the last "condition code" received was a "letter shift" (11111), all data after that is interpreted in the letters column of the 5 level code chart. If the last "condition code" received was a "figure shift" (11011), then all data after that code is interpreted under the figures column. The use of these condition codes has the effect of making the 5 level code appear as if it contained 6 bits. 5 level codes are used by UPI and AP on their CATV wire.

The 6 level code is a rather rare code in that it is used by the stock market and seldom encountered in any other area. Because it can create 2^6 or 64 discrete characters, it does not use a "letter shift" "figure shift" conditioning code; however, it lacks most of the control codes available in the 8 level set. In some uses of the 6 level code, "shift" "unshift" characters are used which expand that code to 128 characters in the same manner as "letter shift" "figure shift" of the 5 level code; however, **Figure One** shows a stock market code which only requires 64 discrete characters and does not use these codes as conditioning codes.

The 8 level code shown in **Figure One** is called ASCII which is the abbreviation for American Standard Code for Information Interchange. This code can create 2^8 or 256 discrete characters. Of the 256, only one half define discrete characters since the 8th bit is usually used as a parity bit or

• PROM (Programmable Memory) authorizes selection of up to 40 channels in any combination. Changing channel authorization is simple—just insert a new PROM.

• 54-channel capacity, convertible to either of two VHF channels, can expand your schedule. For security, electronically controlled descrambling can be implemented on up to 40 individual channels.

• 56" L

KEENE VALLEY VIDEO		
Channel	Channel	Channel
1 NBC Blue	19 Adult Preview	27 SPN
2 ABC World	20 Star Channel	28 Home Theatre Network
3 CBS World	21 WFSB	29 SEAL
4 Educational Channel	22 GSN	30 News
5 Information Channel	23 Cable Taxi	31 Cable Music
6 Sports Network	24 ESPN	32 HBO
7 Adult Network	25 CNN	33 Motion Picture
8 CBS Network	26 ABC	34 HBO TBS 2
9 Educational Network	27 CNN	35 Christian Network
10 International Network	28 CSPAN	36 Classical Network
11 Time Warner	29 Showtime	37 Comedica
12 Weather Radio	30 Nickelodeon	38 Cable News
13 Traffic Information	31 TruTV	39 Consumer Affairs
14 Local Highways	32 Showtime Plus	40 Education Network
15 CTV	33 American Regional	41 Local Organization
16 PTL	34 HBO	42 Sports Channel
17 WFSB	35 Reuters	43 French/Italian
18 WFSB	36 Cablevision	44 Special Events

• Wireless remote tuning offers convenience, across-the-room channel selection for subscribers. The remote unit uses infrared signals which will not interfere with the ultrasonic equipment in your subscriber's television set.

• Remote-Control addressability will let you respond to your subscribers' demands instantly from your headend without the expense of a service call. This feature will soon be available.

channel indicator.

- Digital keypad for touch tuning. Programmable pre-selection of up to 10 channels and roll-through by pushing one button.

Scientific
Atlanta

For protected distribution of sensitive program material, 5 channels can only be made accessible by keying in customer designated 4-digit code.

The Set-Top Terminal that's a lot more than a converter.

Today a new sophisticated Scientific-Atlanta 6700 Set-Top Terminal can widen your subscriber's world of entertainment. And reduce your expenses.

To begin with, the 6700 has the capacity to handle up to 54 channels. It's completely modular and features micro-processor controlled channel selection. A programmable memory (PROM) lets



you tier service on 40 channels. In any combination. They can be changed simply by adding a new

PROM. And these channels can be made hard secure while improving your channel loading characteristics simply by adding our descrambling module. There's convenience for your subscribers with an infrared wireless remote control handpiece. And soon, with another module, you'll enjoy remote control headend addressability to save you trips to subscribers' home anytime service has to be changed.

But what the 6700 brings you most of all is the dependability and reliability of Scientific-Atlanta engineering. For over 16 years we've been working to solve the problems of CATV operators. And the 6700 is another example of why we're the industry's acknowledged leader. This new concept in terminals starts off years ahead. And goes on from there.

For more information, call John Messerschmitt at (404) 449-2000. Or write us.

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Canada: 1640 Bonhill Road, Unit 6, Mississauga, Ontario, L5T
1C8, Canada, Telephone 416-677-6555, Telex 06-983600.

See Us At The NCTA
Booth 402

ASCII 8 Level		Modified 6 Level Baudot Code (Stock Exchange)		5 Level Baudot Code	
WIL 0000000	P 1000000		000000		
SON 0000001	A 1000001	3/8	000001		
STX 0000010	B 1000010	5/8	000010		
ETX 0000011	C 1000011	S	000011		
EDT 0000100	D 1000100		000100		
FWJ 0000101	E 1000101		000101		
ACK 0000110	F 1000110	2	000110		
DEL 0000111	G 1000111	7	000111		
BS 0001000	H 1001000	1/4	001000		
MT 0001001	I 1001001		001001		
LF 0001010	J 1001010	3/4	001010		
VT 0001011	K 1001011	S	001011		
FF 0001100	L 1001100	1/2	001100		
CR 0001101	M 1001101		001101		
SO 0001110	N 1001110	7/8	001110		
ST 0001111	O 1001111	1/8	001111		
DLT 0010000	P 1010000	(Fig 1)	010000		
DC1 0010001	Q 1010001		010001		
DC2 0010010	R 1010010	A	010010		
DC3 0010011	S 1010011	SPACT	010011		
DC4 0010100	T 1010100	(SPECIS)	010100		
NAK 0010101	U 1010101	(CND)	010101		
STN 0010110	V 1010110	A	010110		
ETB 0010111	W 1010111	(Fig 4)	010111		
CAH 0011000	X 1011000		011000		
EM 0011001	Y 1011001	9	011001		
SOB 0011010	Z 1011010	a	011010		
ESC 0011011	[1011011		011011		
FS 0011100	\ 1011100	/	011100		
CS 0011101] 1011101		011101		
FC 0011110	^ 1011110	(Fig 5)	011110		
BS 0011111	~ 1011111	T	011111		
SP 0100000	a 1100000		100000		
0 0100001	b 1100001	V	100001		
1 0100010	c 1100010	X	100010		
2 0100011	d 1100011		100011		
3 0100100	e 1100100	A	100100		
4 0100101	f 1100101	C	100101		
5 0100110	g 1100110	B	100110		
6 0100111	h 1100111	0	100111		
7 0101000	i 1101000	O	101000		
8 0101001	j 1101001	P	101001		
9 0101010	k 1101010	V	101010		
0 0101011	l 1101011		101011		
1 0101100	m 1101100	U	101100		
2 0101101	n 1101101	L	101101		
3 0101110	o 1101110	Z	101110		
4 0101111	p 1101111	T	101111		
5 0110000	q 1110000	K	110000		
6 0110001	r 1110001	C	110001		
7 0110010	s 1110010	0	110010		
8 0110011	t 1110011	F	110011		
9 0110100	u 1110100	S	110100		
0 0110101	v 1110101	R	110101		
1 0110110	w 1110110	P	110110		
2 0110111	x 1110111		110111		
3 0111000	y 1111000	I	111000		
4 0111001	z 1111001	1	111001		
5 0111010	[1111010		111010		
6 0111011] 1111011	PS	111011		
7 0111100	^ 1111100	SPACT	111100		
8 0111101	~ 1111101	Chcam	111101		
9 0111110	1111110	LFeed	111110		
0 0111111	1111111		111111		

FIGURE ONE

ignored depending on the usage. The 128 characters of the ASCII code represent all of the upper case letters, all of the lower case letters, 32 punctuation or special characters, 34 control codes, and the numbers 0 through 9. Most digital communications systems set up in the immediate future should adhere to this code with specific definitions in each system to determine the use of the control codes.

The term **byte** is synonymous with the usage of the word character in this context. The reference to the 8 bits of the ASCII code forming a character could also be stated as the 8 bits of the ASCII code forms an 8 bit byte. You will usually find reference made to the incoming data as being a character. Once the character is into the system, it is referred to as an 8 bit byte. When only four bits of the 8 bit code is used for some form of control or internal computer use, an interesting play on words occurs in that the 4 bits are sometimes referred to as a "nibble."

The term **baud** refers to the rate at which data is transmitted. In most cases, the number of baud can be interpreted as bits per second. Since baud implies a rate of transmission, the terminology of 300 baud can be related directly to 300 bits per second. Although the term baud rate is often used,

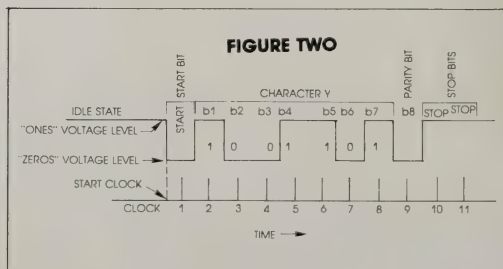
it is actually a misnomer in much the same manner as referring to a CRT tube. Most long line communications such as news, stock or weather information are within the ranges of 50 to 300 baud. The mathematical calculations for data transferred at specific baud rates will be shown following the next section after we have established the number of bits per character for different codes.

Baud rates of 600, 900 and 1200 are being used at present in some long line data systems; however, specialized, or at least more specialized, equipment is required to handle data at these baud rates. For the most part, the limiting factor for baud rate is the method of getting from point A to point B. Over the telephone system, 300 baud is close to maximum without special equipment. Up to 1200 baud can be carried over phone lines with specialized equipment. If the data can be transferred via subcarrier on a microwave link, the band pass of those channels is generally sufficient to allow baud rates from 1200 to 9600 and beyond. In these cases, the speed of the equipment at the receive and transmit sites becomes the major consideration.

One thing to remember about the higher speed baud rates is the actual end item usage of the data to be transmitted. For example, if the end item usage of the data is to fill a television screen, the reading speed of the average viewer is somewhere around 150 baud or about 14 seconds for an eight-line page. If data is received at a higher baud rate, then provisions must be made to store that data and present the final display at the speeds compatible with the average viewer.

WHERE DO WE BEGIN

We have now established that we can get information out of the digital serial input, so now let us look at the methods of establishing how we know one character from another on a line that is simply bouncing between two voltage levels. The two methods used to synchronize the receiver with the incoming data are called synchronous and asynchronous. Synchronous data is seldom used for the forms of data transmission encountered in cable TV. This is a form of transmission generally used for high speed communications between two well defined points.



Asynchronous data has each character bracketed by start and stop bits (reference **Figure Two**). An analysis of this signal will show the main points and some information which could be used in troubleshooting. The idle state is the condition of the line when no data is being sent. The start bit is always the opposite state from the idle line and the stop bits are always the same state as the idle line. It can be seen that the start and stop bits bracket the data so that when this condition arrives at the receiver, the character can be recognized and pulled from between these two brackets. The transition from the idle state to the start bit or where the line initially drops from the "one" to the "zero" voltage levels is critical because the receiver will start its clocking process at that point and continue clocking until it has clocked the 11 bits of that character into the input holding register. **Figure One** shows it takes 11 bit times to transmit an 8 level code with this method. That is 1 start bit, 7 bits of data, 1 parity bit, and 2 stop bits. The 5 level code takes 7½ bits which are 1 start bit, 5 data bits, and 1½ stop bits. The six level code requires from 8½ to 9 bits depending on if 1½ or 2 stop bits are used.

It can be seen that because of the start and stop bit brackets with asynchronous transmission, one character can be sent and recognized at any time in an extended idle state of the line. Under normal data transmission, the characters follow each other in rapid succession which means the start bit for the next character occurs immediately after the stop bits for the previous character.

Now that we have established the number of bits per character required to transmit data in the different codes, the time per page may be calculated as follows: (See Figure 1 Below)

For example, to calculate how long it takes one page to be transmitted in an 8 level ASCII code at 300 baud, would be: (See Figure 2 Below)

If the transmission rate is stated in words/minute, the term "**word**" generally implies **6 characters**.

HOW WE GONNA GET THERE:

The two types of transmission methods most common to cable are **FSK (frequency shift keying)** and **current loop**. Tone transmission or FSK requires a tone decoder at the site where the data is to be used. These tone detectors convert the frequency shifts into voltage or current levels corresponding to the incoming signals. On most of the long line news services, there are many channels of different tones for the different services provided and the receiver must separate out the specific tone group to which it is tuned.

The News Services and most other forms of long line data transmission is FSK. The NOAA Weather Service is generally delivered to the cable system in a current loop configuration. One important point for distinction between these methods is that the voltage level on an FSK line will seldom exceed two to three volts; however, the voltage level on the current loop line may reach 400 or more volts if the line is opened. Caution should be taken to insure that any current loop line is kept shorted during initial installation to prevent accidental shock.

WHERE DO WE GO FROM HERE

The information which this article presents certainly just touches the highlights of the data communications presently in use in cable systems. The discussion on asynchronous transmission lays some ground work for which troubleshooting methods can be established.

It will be interesting over the next few years to keep track of the methods used to transport digital data to and around cable systems. As I stated at the start, cable systems will become more involved with digital data handling in the future so while you are maintaining your dishes and dbs, come down off the pole every once in a while and see what is happening to **digital data handling and communications**.

$$\frac{\text{bits}}{\text{character}} \times \frac{\text{seconds}}{\text{bit}} \left(\frac{1}{\text{baud}} \right) \times \frac{\text{characters}}{\text{page}} = \frac{\text{seconds}}{\text{page}}$$

FIGURE 1

$$11 \frac{\text{bits}}{\text{character}} \times \frac{1}{300} \frac{\text{sec}}{\text{bit}} \left(\frac{1}{\text{baud}} \right) \times \frac{256 \text{ character}}{\text{page}} = 9.38 \frac{\text{sec}}{\text{page}}$$

or for 5 level baudot at 74.2 baud,

$$7\frac{1}{2} \frac{\text{bits}}{\text{character}} \times \frac{1}{74.2} \frac{\text{sec}}{\text{bit}} \left(\frac{1}{\text{baud}} \right) \times 256 \frac{\text{characters}}{\text{page}} = 25.87 \frac{\text{sec}}{\text{page}}$$

FIGURE 2



SEE FOR YOURSELF. THE MOST RADIATION-PROOF CABLES IN THE INDUSTRY.

Today, when radiation from drop cable has become a serious concern to many people, Times has taken action to alleviate the problem significantly.

To begin with, we've developed an instrument called the Radiometer which, for the first time, measures radiation definitively. Until now it was anyone's guess. Radiation characteristics were based on relative ratings and not always accurate. But the Radiometer measures capacitive coupling and transfer impedance. The characteristics of the test sample and the test chambers are measured separately. So now we have radiation data that's absolute, accu-

rate and dependable.

Number two and more important, we've used the Radiometer in Research and Development to bring you improved drop cable. How good is the cable? Thanks to the Radiometer, you can see for yourself in the comparative tests shown on the right.

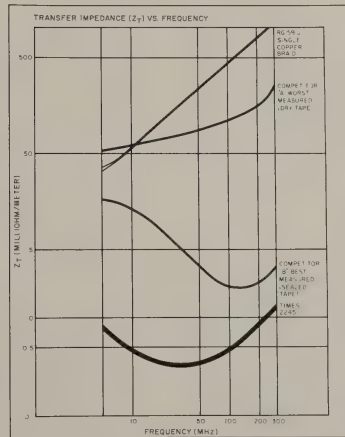
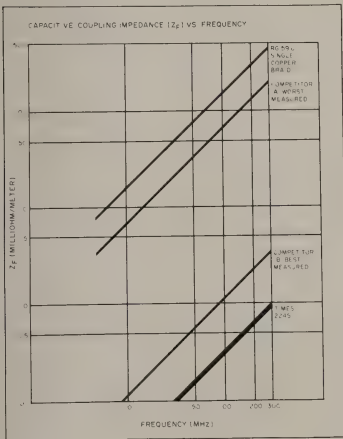
Times 2245, with its sealed foil/double braid construction, is proven to be far superior to every other cable on the market. The best competitive cable (a sealed foil type) was higher in transfer impedance and capacitive coupling. The worst competitive sample we tested was a dry foil construction. And just as a point of reference, we includ-

ed standard MIL SPEC RG59U, the original CATV drop cable.

Not shown but also vital is data taken after flexure testing. After many hours of being subjected to simulated severe wind conditions the radiation from one competitor's cable increased by a factor of 40. But the tough construction of Times 2245 kept it from degrading one iota. What's more, we've improved all of our drop cables. Times can offer you cable with the lowest radiation in every price range construction. And this is no idle boast. Radiometer tests prove it.

The Radiometer, however, isn't limited to duty at the manufacturing level alone. CATV operators can utilize its unique ability to check quality of every reel of drop cable purchased. That's why Times is making the Radiometer Model TNX-247 on a production basis. Selling price: \$975.00 including three different size test chambers to cover all RG-59, RG-6 and RG-11 cable.

So now that radiation is such an important issue, there's never been a better time for Times — our Radiometer and our drop cable.



See Us At The NCTA
Booth 600



Times Wire & Cable
The #1 Cable Company
DIVISION OF TIMES FIBER COMMUNICATIONS, INC.

FINDING THE WINNING COMBINATIONS FOR MARKETING, SALES & PROMOTION FOR SMALL SYSTEMS

The following article on formulating a sales plan was devised by Janie Moriconi, who is the office manager for Crawford County Cable in Frontenac, Kansas. This system has worked well for this particular company which operates TVRO systems in two small towns with 1250 and 1300 households respectively and has a pending application for other adjacent areas near Crawford County.

CATJ realized that Ms. Moriconi had successfully implemented this sales plan for her area and asked that she share with CATJ readers her methods with the hope that there would be helpful and meaningful suggestions for your areas as you buoy your sales and go into a new area.

Gambling with the dollars set aside for promotion is the fool's way to failure. But it is no gamble when you know the odds and place your money on the winning combinations. The secret for small CATV operators is in learning how to figure the odds and find the winning combinations.

The formulation of a sales plan is the basis for promotion pay-offs and the key to a good plan is information.

Before you commit your cash, in fact, before you open for business, you should know your market area thoroughly in several areas - not just miles of plant and houses passed. Correct engineering will give you a good system; correct information about your target area will give you something as important in the long run - **good public relations.**

For example, do you know the **demographics** of your market area? Do you know how the residents derive their income? How many are families with two working parents and how many are single-parent families? What do your potential customers do for relaxation and what are their buying habits in major appliances? Are commuters a significant factor in the market area? Is there a strong ethnic representation in the community? How do the residents pay their utility bills? What is the population turnover rate and is the turnover localized or general?

Knowledge of these factors may seem minor points to you when you're busy trying to juggle the engineering and the administration of a new system, but knowing the facts and interpreting them correctly can save your company's image. Failure to do so can cost public confidence and ultimately set your development back months or even years.

Don't believe it?

Try conducting a telephone sales campaign during the afternoon in a community populated predominantly by retirees. After you have interrupted a few devoted soap opera fans during their favorite program you will understand.

What do you think would happen if you set the **15th** of each month as your payment deadline when the majority of your potential customers derived their incomes from a factory which paid employees on the **20th**?

If the residents of your market area are avid high school sports fans, you can forget week night promotions, but you might want to consider including extra sports programming in your system. And if a significant number of them commute more than 20 miles to work, shouldn't you consider pay packages to cater to their lifestyle? If there is a large Black or Chicano population in the area, might you want to consider one of the new special programming packages aimed at them?

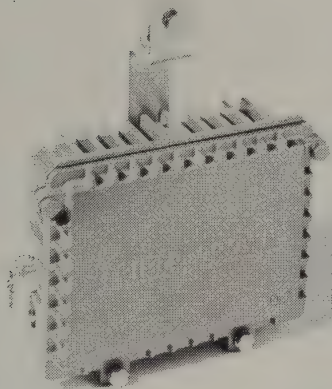
If a large number of the householders own video cassette recorders, your costs will soar and your image will suffer if you send out work crews unprepared for hooking them up.

Are there a lot of single-parent and working couple families in your target area? Would you like to consider Saturday or evening business hours to accommodate them and if so, which evening?

WHERE TO FIND HELP

Avoiding these traps for the unwary need not be as complicated as it sounds. A lot of this information is available for the asking at city,

TRIPLE CROWN . . .



Complete, capable, simple. Qualifications of the perfect second source with a reliability record second to none.

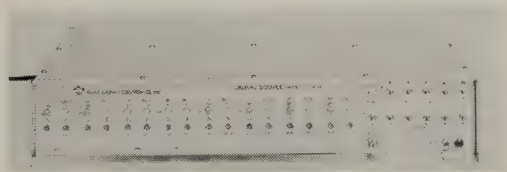
TRIPLE CROWN line extenders are delivered complete with all equipment ready for operation. There are no "extras". No plug-in pads or equalizer "extras". No plug-in diplexer filters, power supply or hardware "extras". They are all supplied or built-in by design because we put a high value on simplicity—for our benefit as well as for yours.



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X24

**with automatic
polarity switching**

Microdyne introduces the X24 — a new frequency synthesized 24-channel TVR receiver.

The X24 provides the frequency agility required to accommodate those rapid changes in satellite programming assignments. Simplified controls eliminate the need for skilled operators and Microdyne's unique threshold extension circuitry (patent pending) pulls in those low-level signals too weak for other receivers to handle.

You'll never miss the start of a program because of the wrong polarization or a forgotten cable connection. An internal coax

switch automatically selects the properly polarized antenna feed when any one of the 24 channels is selected. Changing channels is accomplished manually using front panel controls or remotely via a BCD input.

The X24 is easy on the budget, is a super performer, readily interfaces with any existing system and can be supplied separately or as part of Microdyne's SATRO five meter terminal.

If you have TV programming up there that you need down here, give us a call at 904/687-4633.

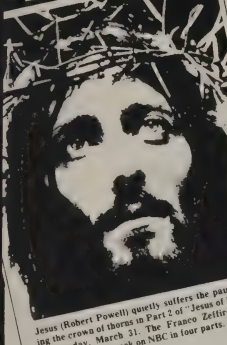
Microdyne Corporation, 471 Oak Road, Ocala, Florida 32672

MICRODYNE

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TV
SCHEDULE

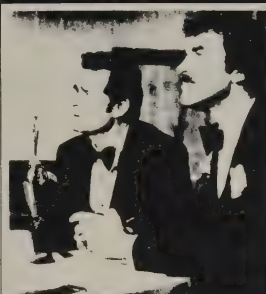
Vol. 1 No. 22, Wed., March 26, 1980

MONDAY



Jesus (Robert Powell) quietly suffers the pain of wearing the crown of thorns in Part 2 of "Jesus of Nazareth," on Monday, March 31. The Franco Zeffirelli epic is rebroadcast this week on NBC in four parts. (REPEAT)

THURSDAY



Rockford (James Garner, L) has just won the Goodbye Trophy — the Private Detective Association's top award — beating out a friend (Tom Selleck), on "The Rockford Files," Thursday, March 27, on NBC. (REPEAT) (Picture courtesy NBC rights to make last minute changes)

" Girard we're
coming your way"

FCC Channel Number	CCC Cable Number	Pittsburg Cable Number	Call Letters	Network Affiliation	Location
2	2		NICK	IND	N.Y. N.Y.
3	3		STAR	IND	Boston, Mass.
4	4		SPN	IND	Tulsa, Okla.
5	5		WTBS	IND	Atlanta, Ga.
6	6		ESPN	IND	Plainville, Conn.
7	7	(17)	CBN	IND	Virginia Bch., Va.
8	8	(18)	WGN	IND	Chicago, Ill.
9	9	(19)	KODE	ABC	Joplin, Mo.
10	10	(20)	KODM	NBC	Pittsburg, Kan.
11	11	(21)	KTVJ	CBS	Joplin, Mo.
12	12	(22)	KKTX	CBN	Dallas, Tx.
13	13	(23)	KCMO	CBS	Kansas City, Mo.
14	14	(24)	HBO	IND	New York, N.Y.
		(25)	* Weather-ESPN		
		(26)	Alternate Weather		
		(27)	KTUL	ABC	Tulsa, Ok.
		(28)	KMBC	ABC	Kansas City, Mo.
		(29)	KOED	PBS	Tulsa, Mo.
		(30)	KDMA	IND	Kansas City, Mo.

* Madison Square Garden
U.S. House of Representatives
College (1:30-3:30 p.m.)

FREE At Local Merchants

Thurs., Mar. 27
Thru
Wed., April 2, 1980

county and state offices. Businessmen, bankers, etc. can supply much of the rest. However, if you're too busy to do the asking for yourself, any good public relations or marketing firm can compile the data and show you how to interpret it for a sales plan.

Sales for small cable systems fall into two distinct but inter-related categories - **sale of a new or existing system to new customers**, and **sale of a new service to new or existing customers in an existing system**.

Your tools are: (1) **print** - newspapers, brochures and fliers; (2) **broadcast** - radio and television; (3) **display** - posters, billboards, etc.; and (4) **direct contact** - front office, telephone promotion or door-to-door sales which may incorporate some print as well. The winning combination will depend upon the situation in your market, your advertising budget, and the availability of the tools - OR, just maybe, on our ability to find the tools when they apparently are unavailable.

On the most basic level, your best selling point is your programming schedule and the best way to present the schedule is in the printed form. The reproduction of your entire schedule uncluttered by competing information is a powerful argument for you providing you get it to your potential customers in an economical package.

One innovative approach to marketing today puts the cable owner or operator in the role of

schedule publisher - a multi-media attack with many bonuses.

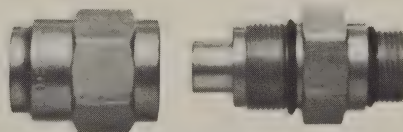
Cable systems have traditionally depended on the **print media**, like local newspapers or TV Guide, to provide their subscribers with a listing of the week's programming, but in so doing they have ignored a dynamic tool both for internal promotion and for generating additional revenue.

Allowing other elements of the communications industry to control the listing of television programming has also created a situation in which the advertising-promotion dollar of the cable system is frequently too widely disbursed to be cost-effective.

Paying for heavy advertising campaigns in the mass media - broadcast or print - too often has a scatter-gun effect. Only those people in your target area can use the information contained in the advertising although it may be directed to hundreds of thousands. The advertising in a system-sponsored schedule goes only to those people who can use it.

Printed schedules mailed directly to each subscriber weekly can also be expanded periodically to general mailings in a market area and can give system personnel an exciting tool to use in personal selling approaches. More important, such schedules can be designed to pay for themselves and even to produce extra revenue. A good manager will include at least part of the cost of printing and mailing the schedules in his total

The with no stinger!



The LRC Innovators announce the "B" series entry connector (EMI).

It has all the characteristics of our original EMI—the same radiation sleeve, crimping mechanism, internal fitting and RF integrity—but it's shorter. It's a good deal for you because it means shorter center conductor preparation.

The "B" series EMI from LRC, it's a honey of a connector.

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LRC ELECTRONICS, INC.

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AVAILABLE IN EUROPE THRU: Electro Service N.V., Kleine Nieuwendijk 40, B 2800 Michelen, Belgium
CANADA THRU: Electroline TV Equipment, Montreal, Quebec

What's Scarlett What's a gorilla



What's HBO without

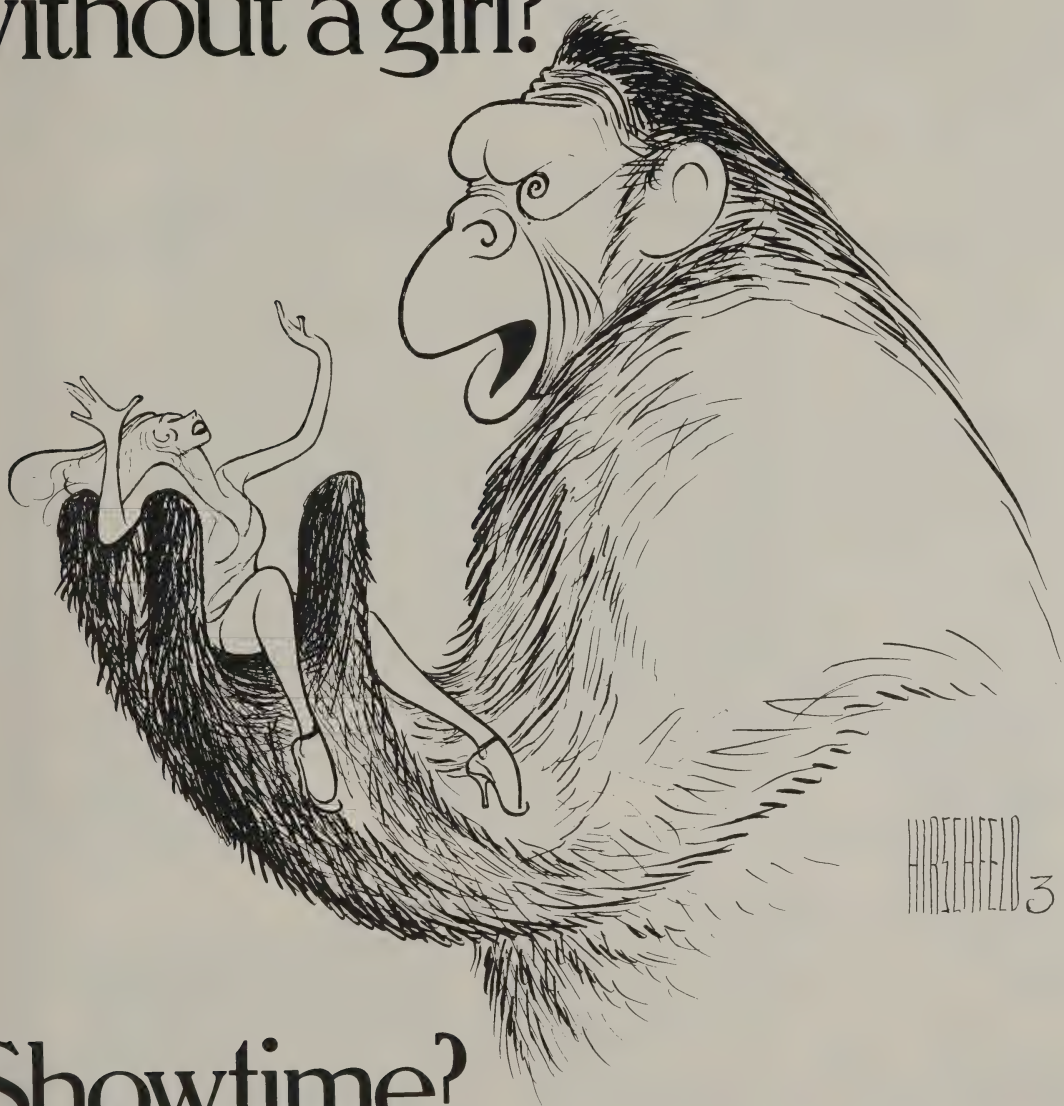
Not as entertaining. Not as broadly appealing. And not nearly as profitable. Because like any great entertainment pair, HBO and Showtime together equal a great deal more than the sum of their parts.

Just ask any of the more than 40 cable systems that are currently offering two premium pay channels together. An astounding 59% of their cable subscribers subscribed to both. With an

average revenue increase of 65%!

Though Showtime may be only half of the dual-market package, we think we're wholly responsible for the success of it. Part of that is history: three successive years of fresh, exciting programming. Blockbuster movies, exclusive star-studded variety specials, live comedy, Broadway, and off-Broadway shows. Programming that our current subscribers are committed to. And pro-

without Rhett? without a girl?



Showtime?

gramming that stands apart...from HBO or any other service, with dramatically little duplication.

The other part is yet to come. Right now, we're developing programming that'll keep viewers tuned to Showtime. With increased on-the-air hours, movies and mini-series produced just for us, and much, much more. All designed to make Showtime even bigger, better and brighter in the future. And a continuing source of revenue for you.

When you add it all up, Showtime is quite an act. Alone or in combination. So call one of our regional representatives. You'll find out what we've been saying all along....For everybody concerned, Showtime is television worth paying for.

SHOWTIME[®]
TELEVISION WORTH PAYING FOR![™]

subscription fees. A savvy manager will parlay his message channel and printed schedule into an advertising package to sell **not only** his cable **but also** anything else and he will charge the purveyors of "anything else" for the privilege. Outside advertisers will be attracted to a video-print package because it promises double exposure and will cost less than advertising placed with traditional commercial media.

Furthermore, cable operators frequently ignore or undervalue their message channels as sales tools. If operators fail to use their own promotion tools effectively, they are wasting promotion dollars. The video-print approach to marketing has the added benefit of focusing the operator's attention on his own resources.

UNIQUE CONDITIONS TODAY

The situation of the small CATV operator today is unique in relation to the print media. It is a development traceable directly to the boom in satellite communication technology. A few years ago, cable systems were so expensive that only larger communities promised adequate returns for the investment needed to build them. Such communities were invariably served by large daily newspapers with healthy budgets. Thus, cable systems had little trouble getting their schedules printed locally; in fact, many didn't even have to ask. New cable systems are penetrating into the suburbs and into smaller rural communities where such printed amenities are scarce.

However, the possibility still exists for getting other independent media to print your schedules.

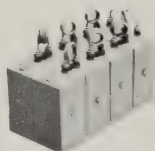
In a community served by a daily newspaper with a circulation of 5,000 or more, getting the schedule published should just be a matter of presenting your request to the publisher. Most newspapers of that size can afford the cost of purchasing pre-printed schedules and can absorb the cost of extra paper needed to print the weekly schedules. The publisher will probably jump at the chance of adding a revenue-producing feature and he will recognize the advertising attraction of the schedule.

If your market area is served by a small daily or weekly newspaper, you may find the going more difficult. Many smaller operations can't afford it and, more important, they simply can't get the paper necessary to print an expanded edition with your schedule. Remember when newspapers began dropping their Sunday comics a few years ago? The reason was a shortage of newsprint and the situation hasn't improved much in the intervening period.

If your operation is based in a community which has no local newspaper, but is served by a larger town's daily newspaper, you will probably run into a brick wall. A cost-conscious publisher won't consider running several pages worth of information for say 1,000 of his subscribers if it is no use at all to the other 39,000 or so newspaper customers.

In any case, the mass media should not be

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Remove a complete channel spectrum without adjacent splash.

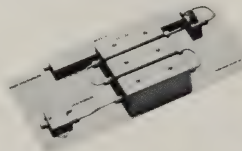
3271AA Series



CHANNELPASSER

Sharply cuts off adjacent channels.

3303 Series



MASS

DESCRAMBLING NETWORK

Descrambles an entire motel, school, hospital or clean an off-air channel & insert CCTV.



ye Compleat TRAPPER

Stop Fretting
over that
filter problem.

Get an answer -
TODAY.

Call:
Glyn BOSTICK
(and tell him
where it hurts)

AT DALLAS - Booth 215
Consult - Ye Compleat Trapper
On Your Problem

CALL US FOR MORE PROFIT

- Your only product is clear pictures. We can help you reduce those churn-producing offenders.
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- Designing special tiers of premium service. Stuck for hardware? We can devise traps or pay-only filters for almost any situation.

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- Channel BPF
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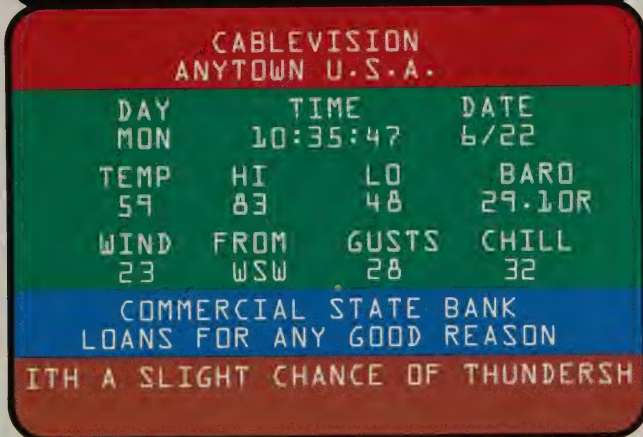
Microwave Filter Co., 6743 Kinne St., E. Syracuse, NY 13057

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ignored in your pursuit of sales. The tendency to overlook the importance of other media is a mistake small cable operators shouldn't make in their total campaign. Too many small companies miss the most effective and cheapest route to mass media exposure - the news department.

Identifying the right approach to the news angle is an effort that can pay vast dividends. In fact, it could be the best time you ever invested. Surveys have proved that a news story is better read (or listened to) than almost any ad and a news story with a picture is even better whether it's in print or broadcast.

PRACTICAL APPROACHES

Use the news departments of the local media and a system-backed printed schedule to kick-off a new system or a new service.

START-UP:

In a start-up promotion, the schedule should be distributed by mail to every household in a service area and the cost should be far less than that of a door-to-door canvass. For maximum impact, the schedule should include a **sign-up discount** offer and should begin a couple of weeks in advance of your sign-on.

CONTINUING PROMOTION:

After the start-up promotion, the schedule could go regularly only to system subscribers and subscriber fees should be set to cover at least part of the costs. Mailing lists for the original promotion should be retained and used periodically for blanket mailing to the target area and for future special promotions. This could be a particularly effective form of promotion for high turnover areas. Leave a few copies of each week's schedule at high traffic spots in the community for a little extra exposure and keep a few in your office for new customers.

Because the system-sponsored schedule has the additional benefit of focusing the promotion dollar on the exact target area you want to reach, your advertising budget can be used in the most effective way at the most effective time.

NEW SERVICES:

Use the news and your printed schedule, too, for promoting a new service in an existing system. Offering free previews of new programming is the currently accepted method of promotion, but it is valueless unless your customers know that the preview is available. In such a promotion, and especially one for a new pay service, pull out the stops. The returns are worth it. Make use of your own message channel and any other commercial time available to you on your own system. Make use of other broadcast media for a brief, but heavy, campaign just before the previews. Saturate the target area with your own scheduling including an announcement of the preview and go in for posters, billboards and fliers if your budget permits. Focusing individually on outstanding coming attractions is a variation that works well with pay packages and has the virtue of being inexpensive. Pay programmers frequently supply display promotional materials free of charge.

Elements of these approaches should be used for subsequent promotions for new subscribers. A follow-up campaign should be tied to a discount or a premium offer for best results. In planning your special sign-up campaigns, take advantage of special programming, such as the start of baseball season, and don't forget traditional gift-giving occasions such as Christmas, Mother's Day and Father's Day. Anniversaries such as the annual observance of the system's sign-on, can also be the occasion for such special promotions.

AUXILIARY PROMOTIONS:

Walk-in sales in your front office will take care of themselves providing your staff is well-trained, capable of meeting the public, and has the proper tools. Copies of your programming schedule and a rate card would provide the necessary aids.

A **door-to-door canvass** requires much more planning, luck with the weather, and an intensive look at the market data mentioned at the beginning of this article. Paying people to canvass at a time when the whole town has followed the high school basketball team to the state tournament is at least a waste of effort.

Telephone sales campaigns, too, take considerable planning to achieve the best results. The group dynamics techniques perfected by professional fund-raising organizations work best for commercial endeavors as well. Again make careful use of your market data before planning the campaign.

For best results, both the telephone and door-to-door canvasses should be tied to a special promotion of some kind simply because it's easier to be enthusiastic about selling something if there's a good reason, and the attitude of your personnel in such direct contact situations has a big influence on their effectiveness.

It is also important to make sure that your whole organization is ready for any promotion and geared to handle extra work.

Planning a promotion while your office staff is making out its annual report would be unwise. Encouraging extra work orders while your technical crew is changing out your head end could be a disaster not only for your physical plant but also for your public profile.

HOW MUCH IS ENOUGH?

The most important decision, however, is deciding how much to spend. You don't want to waste money; but too little promotion or dollars improperly applied can fail to produce results and be an equal waste.

So, how much is enough?

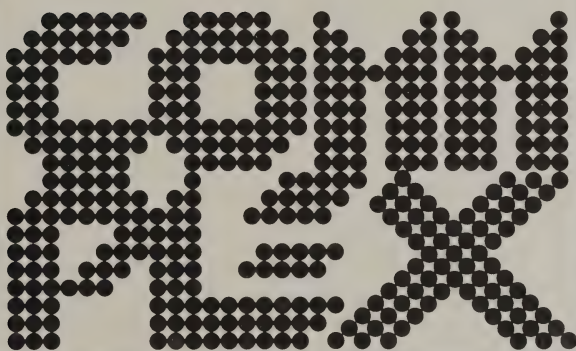
Conventional Madison Avenue wisdom says at least 10 percent of an operating budget should go into advertising for maintained fiscal health. Factors such as a high turnover rate might demand even higher expenditure for regular promotion. Greater expenditures during a start-up period are also indicated.

A big splash at the top not only looks good on the balance sheets, but also gives your organization the momentum it needs to continue operating in high gear.

**The place
CATV operators
keep coming to
to keep going...**

**Communications
Comm-Plex Inc.**

with:

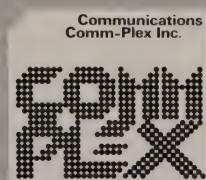


Besides stocking a full range of leading CATV equipment COMM-PLEX provides you with: engineering and systems planning; technical problem solving; strong warranty-support repair service; prompt delivery of your order;

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ANNOUNCING TOCOM'S NEW 7-CHANNEL BLOCK CONVERTER WITH DUAL CONVERSION.

Here's your chance to offer seven new entertainment channels to your subscribers while you benefit from TOCOM's innovative and quality conscious engineering.

Our 7-Channel Block Converter uses the dual conversion principle so it doesn't require inverted head-end equipment.

It operates on standard FCC assigned frequencies and provides clear conversion of mid-band channels A through G to VHF channels 7 through 13. In addition, the unit can be bypassed for standard channel operation and easily fine tuned.

More Building Blocks

That's just one of TOCOM's many exciting converter products. Our Paymate®

is one of the most popular converter/descramblers on the market. We also offer a 3-Channel Block Converter that has received strong acceptance in the marketplace for its reliability and profitability.

The Leader In Innovation

Our family of high performance converters proves that you don't have to have a two-way system to buy from TOCOM. The reason is simple: We think everyone should benefit from our high quality, innovative products.

For more information, call TOCOM's CATV Marketing Department at 214/438-7691. Or write to TOCOM, P. O. Box 47066 Dallas, Texas 75247.

TOCOM

The leader in two-way.

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Now Transient Surge Damage Is Your Fault—Not Ours



If you are not using RMS **'POWER-KING'**™ power supply series for a significant increase in performance reliability, while greatly reducing maintenance and operational cost, then don't blame us. Models PS-30, PS-60 and PS-60/30 Regulated AC Power Supplies.

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TECHNICAL TOPICS

NEED A POLE STAND???

Here's How To Make One

Sometimes the most difficult thing about installing or maintaining equipment is the awkward position in which you have to reach the areas. In the case of **splicing** electronic equipment, this is **very** difficult when you are working in back lot easements where you cannot get in with a truck.

We will be discussing the three ways in which to install an amplifier:

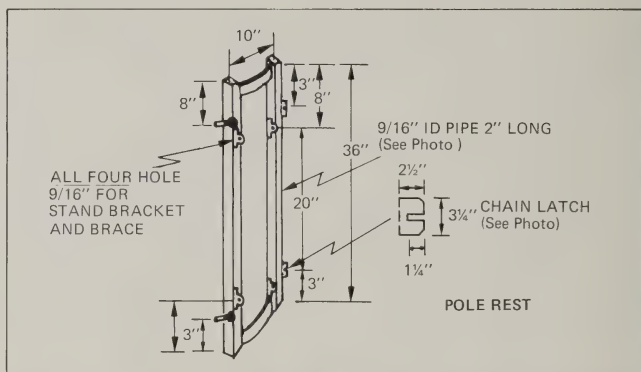
1. Off Your Hooks
2. With a Ladder
3. With a Pole Stand

When splicing off your hooks, sometimes you will have a piece of equipment where you cannot form the loop on either the input or the output of the amplifier, depending on what side of the pole the equipment is on. Sometimes then splicers have to crawl out on the telco to make the expansion loop, strap off to the TV cable to re-position the "e" lashing wire clamp, band and spacer. That's all because you cannot reach it from the pole. With safety and protection of health being a consideration, how about that? And what about the relation-

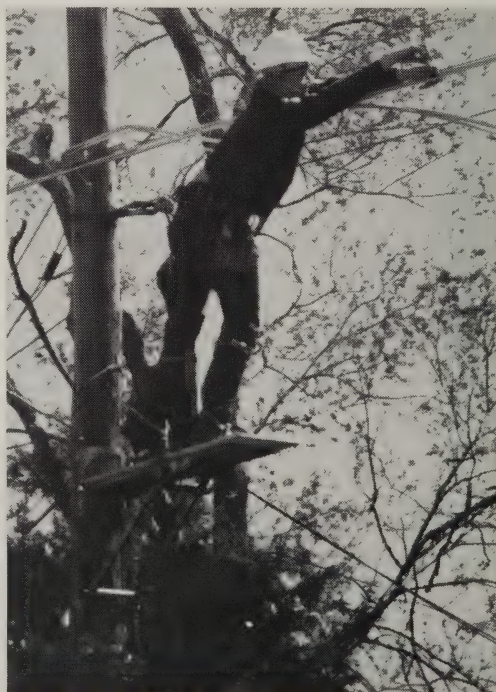
ship with your local telephone company when they see the splicer in that position? Not too good!!!

Then if you use a ladder to splice an amplifier, how many times do the splicers have to move the ladder to complete the splice job?—two, three, four, and maybe even more, and then perhaps you have to use your hooks to finish the job. Then the problem arises of

having to take your ladder back to the pole lines around fences, trees, bushes, and gardens, and this can create problems with personal property. It isn't uncommon to put your ladder on the telco lead line or near a splice, and then three or four days later (or sometimes weeks later) the telco plant supervisor calls your cable company to say, "When your splicer spliced your cable, he



Pole stand mounted — ready for use.



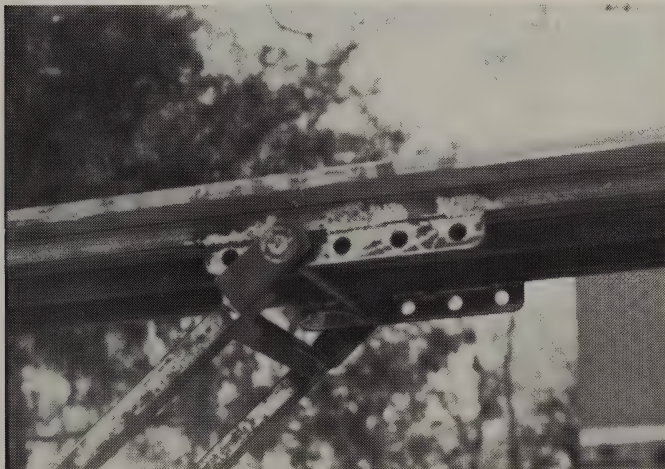
Pole Stand is used for "hard-to-reach" situations in splicing.



Detail showing crank used for securing unit to pole.



Chain latch is shown here. See chain latch diagram.



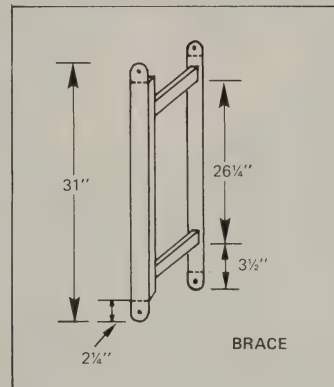
This photo shows stand leveling detail. This makes adjustable angles possible with the pole stand.

caused our lead line to crack at the splice and caused the 200 pr. line to get water in it. The damage your company must pay will be XXX dollars to replace the line." That makes for a bad situation for your company to get into for sure!!!

So, from experience, by using the pole stand, this looks like the best way to approach this situation. By using the pole stand, which takes only three minutes to install on the pole, the splicer can reach out as far as eight to ten feet

from the pole. When the pole stand is set up, the splicer will be able to complete the splice job within a shorter period of time, as compared to the above two methods. It can also be used on an amplifier when pulling maintenance in a back lot line, which is hard to reach off your hooks.

The total cost of building a pole stand is minimal, considering the time and labor saved, as well as considering the safety factor. Total cost involved in



building such a pole stand would be from \$85 to \$150 depending on if you have welding abilities within your staff, or if you must go to a welder to construct it.

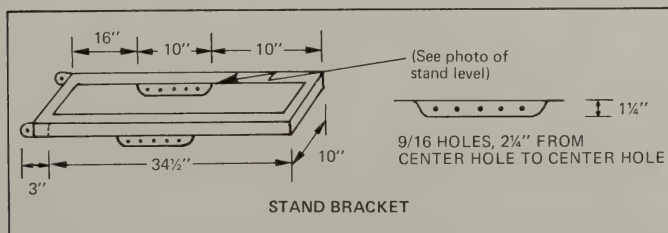
Following are the materials needed:

- 184" square tubular pipe
- 60" 1 1/2" angle iron
- 72" #10 chain
- 4 1/2" x 1 1/2" bolts with nuts
- 1 1/2" x 11" straight bolt
- 1 3/4" x 12' x 46' plywood board

The diagrams illustrate the method used to construct this pole stand, and you can see it is relatively simple construction.

If you plan on splicing a lot in the future, this pole stand will be a big time saver for you and your company's work crews. We have found that another helpful piece of equipment is a **tree stand** which can be purchased at most sporting goods stores. With a few revisions, this stand will give you up to six feet of side reach.

By using the diagrams and pictures in this article to construct the pole stand, it is a relatively simple and easy thing to do and will provide you with a valuable piece of equipment. Should you have any questions, please contact **Technical Topics** at **CATJ**.



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Choose from the galaxy of programs on WOR-TV, New York. SEE A "WORLD OF DIFFERENCE" IN CABLE PENETRATION.

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Increase your subscriber count today with WOR.
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Call Sam Morse or Charlie Mills (315) 455-5955.
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**BACK BY POPULAR
DEMAND!!!**

Again, CATJ is offering the low cost do-it-yourself microwave kit. After many requests for a repeat of this particular kit, CATJ is able to offer this receiver kit. . .

BUT, and we know you'll understand. . .because of inflationary pricing, component parts have increased in price some 15-18 percent in the last two years, so it is necessary that we increase our price to you. The price for the "Mini-Wave" kit is \$230.—still a bargain for low cost microwave equipment.

To refresh your memory, everything is with this kit except the GunnPlexers—the housing, circuit boards and parts. We provide instructions and sources for the parabolic antennas should you require more range than the 17 dB gain horn antennas offer.

This is an exceptional value, even at the increased price, for experimental microwave work, and will put you on the air with both a 1t mW transmitter (transmits baseband video, such as 1 volt peak to peak and audio) and a high quality receiver.

If you have been wanting to work with your own low cost microwave equipment, this CATJ Mini-Wave Kit makes it possible, and this is an EXCEPTIONAL buy for the small system operators.

Again, only a LIMITED NUMBER of these kits will be available, so order yours today. Use the tear-out card below and order yours today!!!

the gain block kit

What is more basic than 'gain'? Here is the idea 'shop-mate' for your CATV bench. . .a 117 VAC powered 30 dB "gain block" that produces input to output port hybrid chip gain that covers the range from 30 to 300 MHz (plus!).

The 'Gain Block' was developed in the CATJ Lab as a versatile kit project. No tuned circuits (very high quality Hewlett Packard 30 dB gain gold IC/hybrid on sapphire substrate); no tuning, coils or adjustments! Gain extends below 30 MHz (25 dBg at 10 MHz) and up to 450 MHz (still 25 dBg).

All parts are supplied. The housing, regulated power supply (with output jacks to provide a bench-convenient emergency 15 VDC source), the special double-sided etched and drilled circuit board, all controls and components. **PLUS** - a handy manual that illustrates construction plus application of this handy amplifier.

THE PRICE is \$105 but only as long as our initial supply of "good-buy" HP gold plate hybrid IC's lasts. When the initial stock is gone, the price of the "Gain Block" goes up to \$145. So catch us early while this special introductory price is still good!

TVRO DEMOD KIT. . .this amazing phase lock loop video demodulator kit was developed by CATJ's Steve Birkill and first explained in the October 1978 issue of CATJ. This is the video demodulator that takes a very weak 70 MHz IF signal and turns it into a television picture with a minimum of effort. **PLUS** — it is probably the most sensitive video demodulator circuit available when you deal with below threshold TVRO signals. This is not recommended for big commercial installations, but for people who want to learn more about TVRO reception techniques this will fill the bill. **Price per kit** is \$32. postpaid in USA and Canada.

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_____ \$230 ENCLOSED - for one complete "MINI-WAVE" transmitter and receiver kit.

_____ \$105 ENCLOSED - for one GAIN BLOCK kit from the CATJ Lab.

_____ \$32 ENCLOSED - for the "TVRO Demod" kit for weak signal satellite video reception

Ship to:

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Company _____

Address _____

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Enclose payment with order to:
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Suite 106, 4209 N.W. 23rd
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CATJ'S KIT ORDER

FM Video Transmission Wall Chart?

Who Needs Something As Off The Wall As That?

***A cable operator
in the 1980's –
That's Who!***

With the drastic increase in satellite and terrestrial microwave use in the communications industry **FM video transmission** is becoming commonplace.

Keeping this in mind, CATJ presents the newest addition to its wall chart family — **the FM Video Transmission Wall Chart**. This chart gives you a basic introduction to FM transmission, helping you to recognize particular distortions or set up problems, whether observed with a waveform monitor or a video monitor.

So for those of you who are saddled with the responsibility to **"keep it working"**, this CATJ wall chart has been developed to be used as a trouble-shooting aid to help you recognize the most common set-up errors and distortions associated with FM Video Transmission.

Order Today! Use the handy tear-out card below and mail to CATJ.

FM VIDEO TRANSMISSION WALL CHART

_____ \$10.00 enclosed for FM Video Transmission Wall Chart.

(note: foreign orders, send in U.S. currency only.)

SHIP TO:

NAME _____

Address _____

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Send order to: **CATJ MAGAZINE**
Suite 106, 4209 NW 23rd
Oklahoma City, Oklahoma
73107

A subcarrier audio demodulator using readily available ICs.

Since preparing February's column, it has come to my notice that the National LM1808 device, specified for the audio demodulator, has become difficult or impossible to obtain. It seems that National Semiconductor have withdrawn the IC from production, and such supply as there has been was only from existing stocks and inevitably very limited.

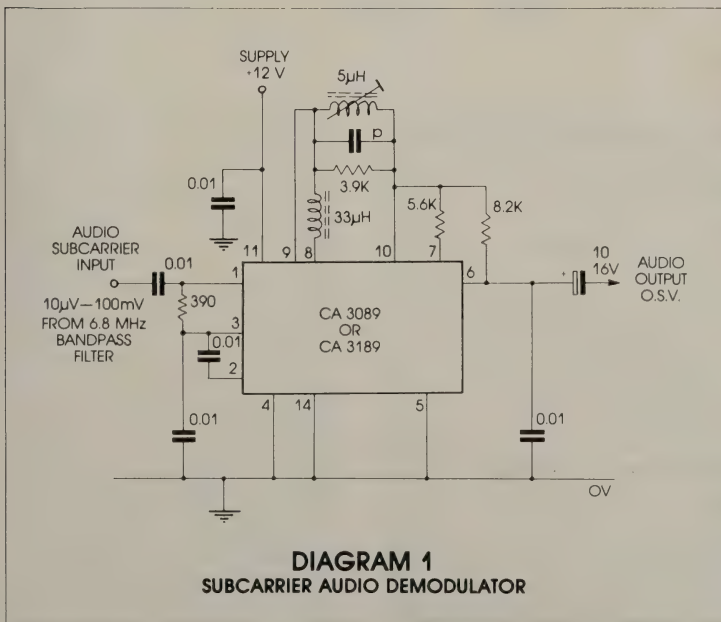
So here we present an alternative design, using RCA's very popular CA3089 chip. It will also work with the newer CA3189, though the latter's sophisticated muting facilities go unused in this application. Unlike the LM1808, the RCA devices do not incorporate an audio power amplifier on chip. This was not thought to be a very great disadvantage, as most TVROs feed a VHF TV modulator either to drive direct into a standard TV or as part of a CATV head-end, both applications needing only low-level audio. If a loudspeaker monitor is required at the TVRO, the facility can be provided by one of the integrated audio power amplifiers of one or two watts output capability, such as

the LM380 (which **is** being manufactured in quantity!)

The RCA catalog does include an IC similar to the LM1808: the CA3134 combines an FM demod with audio power amp, but I have not had the opportunity to try this type.

Diagram 1 shows the CA3089 circuit. For stability, the IC needs to see a low source impedance. This is defined by the 390 ohm resistor at the input. The quadrature tuned circuit is similar to that specified for the LM1808. Component values are

chosen to achieve resonance at subcarrier frequency, and the coil is adjusted on a 6.8 MHz (or other chosen subcarrier frequency) signal, for minimum distortion of the demodulated audio. Due to the circuit's high gain, VHF-type layout and decoupling practice should be adhered to, avoiding common grounding paths which could result in instability. No volume control is provided - this would be incorporated before the audio amp if one was used. For low-level output, an emitter-



Steve J. Birkill

On

Experimental Earth Terminals

Steve J. Birkill
Real-World Technology
128 Cross House Road
Grenoside, Sheffield S30 3RX England

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follower could be fed from pin 6 of the IC as a line driver, the output level being pre-settable by adjustment of the 8.2K resistor between pins 6 and 10.

BIASING THE GaAs-FET LNA

Whatever type of device a designer chooses for his low-noise amplifier, he has to feed it with the bias voltages it needs and control the current it takes, to maintain the device at its optimum operating point for low noise consistent with high gain. Additionally, he must ensure that the radio-frequency paths into and out of the device are impeded as little as possible by the necessary DC bias paths. This means that bias must be applied at points decoupled to RF potentials, requiring some kind of RF choke between bias supply and transistor, and also bias blocking capacitors to prevent the bias volts being shorted out by external RF circuitry, or having a detrimental effect on the biasing of other stages. (Diagram 2)

Important also is the RF impedance of the lead grounding the common terminal of the amplifying device (transistor). Any impedance in series with this lead, and at the frequencies of interest it will be an inductive impedance, will give rise to degenerative negative feedback,

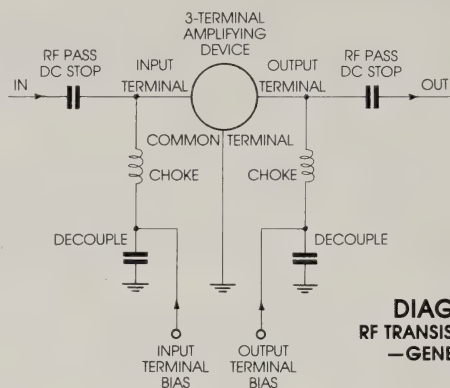


DIAGRAM 2
RF TRANSISTOR BIASING
—GENERAL CASE

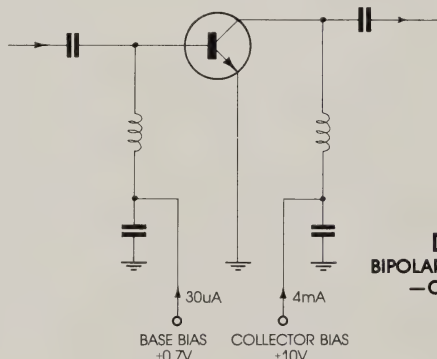


DIAGRAM 3
BIPOLAR TRANSISTOR BIASING
—COMMON EMITTER

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seriously degrading the gain and noise figure of the amplifier.

Now if our designer chooses to use a bipolar transistor, and for low noise at SHF this will be configured for common-emitter operation, the arrangement becomes that of diagram 3. For an NPN transistor, both base and collector require to be biased positive of emitter—typical values are shown. No emitter resistor is required, as the operating point can be stabilized by an external regulator stage, as used in the bipolar LNA design published in this journal for July 1979.

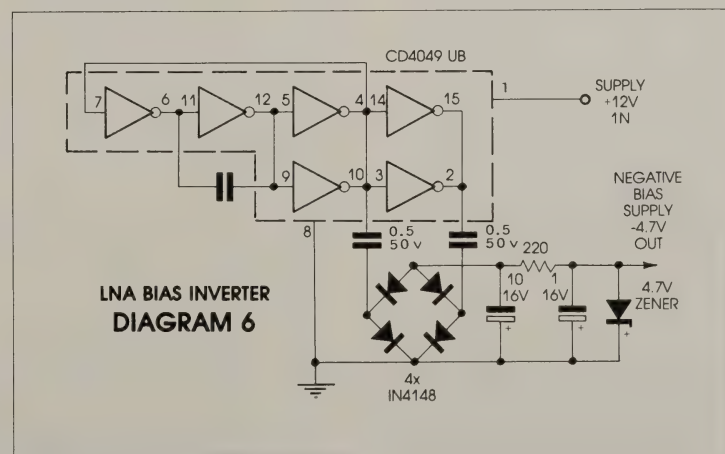
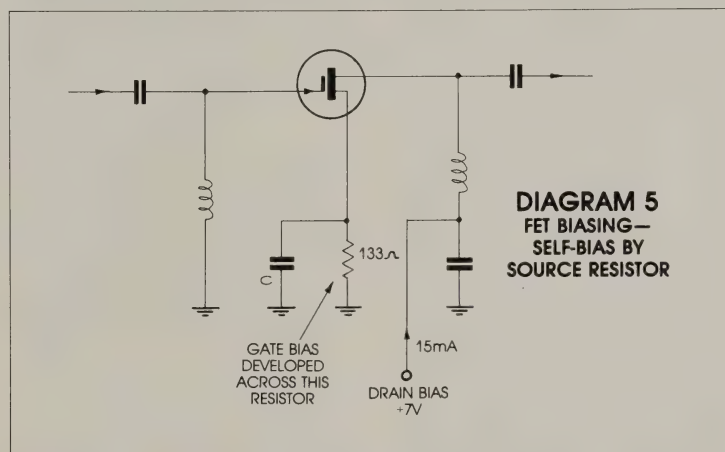
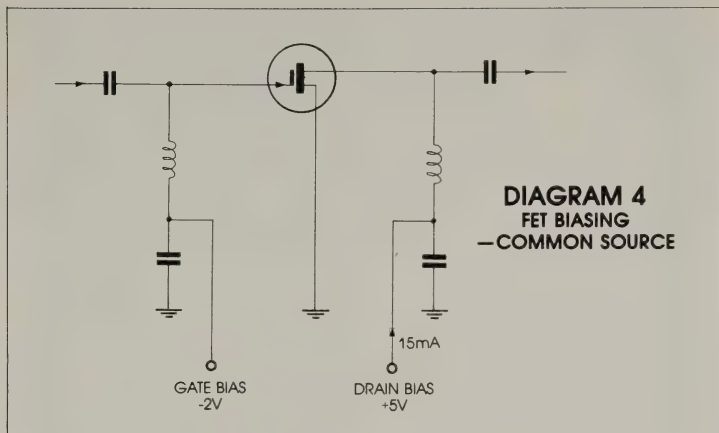
In deciding on the precise configuration of the microwave matching networks, the designer can choose a matching topology that dispenses with the need

for feed chokes. For instance he can arrange for a shunt stub to require an RF ground at its remote end. It is then a simple matter to decouple the end of the stub and apply bias volts at that point.

If, as will be the case in most TVROs, the designer wishes to employ a Gallium Arsenide Field-Effect Transistor, then his bias circuit becomes as shown in diagram 4. Here, the GaAs-FET (being N-channel) needs its drain biased positive of its source, but its gate must be held negative of source. Plainly this needs two supply rails, one positive and one negative of ground. One way to avoid that requirement is to make the FET self-biased, by inserting a bias resistor in the source lead, so that the voltage drop produced across the resistor by the FET's source current, lifts the source voltage above ground, effectively biasing gate negative with respect to source (Diagram 5). This requires the supply voltage to be increased to about 7V, to maintain a 5 volt bias between drain and source, but has the advantage of dispensing with the negative supply, so enabling the LNA to be powered by feeding DC along the RF feed line between LNA and receiver.

The disadvantage of this method is the difficulty of providing good enough low inductance RF decoupling (capacitor C) of the GaAs-FET's source. GaAs-FET packages are designed for stripline or microstrip mounting, with the source connected direct to the ground plane — it is often a problem mechanically as well as electrically to ground the source to RF without grounding it to DC, and the penalty for inadequate RF grounding will be paid in reduced gain and increased noise, as already described.

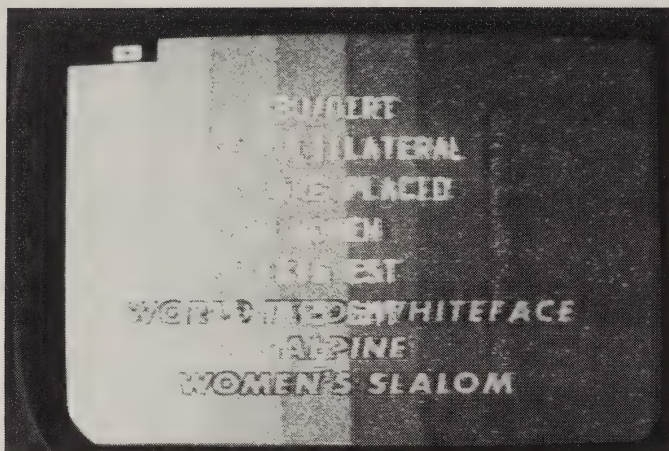
So, reverting to the diagram 4 arrangement, is there anything else we can do to avoid the split supplies requirement? You guessed it! The fact is that the GaAs-FET draws near enough zero gate current. So our negative supply need only be capable of enough current to feed the potentiometer that adjusts bias.



If we start with -5V and use a 5K pot, that means 1mA. And that kind of current we can easily rustle up in a small DC-DC

converter (inverter) powered from the positive supply rail, and incorporated within the LNA.

Diagram 6 shows such an



February 1980 The world feed of Winter Olympics from Lake Placid, carried via Intelsat to Europe, converted to 625-line PAL color, distributed from Brussels, Belgium on the Eurovision network, converted in Moscow to 625-line SECAM color, and re-transmitted on the Atlantic satellite Stations-4 (Ghorizont 2), 3895 MHz, the 29dBW channel 5 transponder being received on the writer's 8' terminal in Sheffield, England.

inverter based on a CMOS hex inverting buffer chip, CD4049. It may seem like overkill, but this circuit will generate 4.7 volts negative at currents of up to 10 mA, from a single 12 volt positive supply, taking between 40 and 50 mA from that supply. (Consumption and capability will be correspondingly reduced if operated from a +5V rail, but most LNAs will have +12V available, for the bipolar 'bulk gain' stages, feeding say a 5V regulator IC for the GaAs-FET supply. This has been assumed in the design.) Three of the CD4049's inverters are connected as a ring oscillator, running at around 10 kHz (set by the 0.1 microfarad capacitor). The third inverter is doubled up to provide greater current capa-

bility, and the output is again inverted by another parallel pair. The resulting push-pull (180° phase difference) outputs feed a bridge rectifier using standard silicon signal diodes, a 10 microfarad electrolytic acts as reservoir capacitor, and any remaining ripple is handled by the filter network incorporating a zener diode. This also stabilizes the output at -4.7V. One or more bias potentiometers can now be connected across this output, to bias the GaAs-FET gates in the LNA, or anywhere else a no-current negative supply is needed. The fact that the negative bias cannot be present until after the LNA's positive supply has been turned on is in practice no real hazard - small-signal GaAs-FETs are normally well

within their ratings even at saturated drain current, when operated at the recommended drain-source voltage.

This doesn't mean we can afford to be careless with bias connections. Mistakes are invariably costly. The zener diode is a very useful kind of protection, preventing bias being reversed by more than 0.7V, and preventing excessive bias in the normal direction. But to be fully effective, the protection must be close to the actual device. Any inductance in the way means the protection is ineffective at high frequencies, and it may be high-frequency energy from a nearby lightning strike that destroys your FET! For the same reason, a capacitor of at least 0.1 microfarad should also be connected between bias line and ground as near to the device (beyond the RF decoupling of course) as possible, to bypass transient spikes before they can reach the transistor. Both these techniques have been employed in the LNA design published here in December 1979. If these transient overload protection measures are correctly applied, the RF device will be protected from all supply-line or ground-borne transients except those having a harmful energy level at 4 GHz or above, which can actually enter the LNA through the input socket or feed-horn. The use of a regulator IC (such as the 7805) within the LNA, to supply the FET stages, will also improve rejection of supply-borne spikes, and prolong the life of the active device.

CATA MEMBER CAUTIONS FOR DANGER OF EQUIPMENT THEFT

CATJ has been asked by one of CATA's loyal members, **John Craven, Jr., at Sierra Communication Systems, Inc., Smartville, California**, to ask fellow-cable operators to be on the outlook for equipment stolen from a satellite station in Lake Wildwood, California. The following items were taken:

COMTECH EQUIPMENT:
Receiver RCV-450A, S/N 79
Amplifier 1.5 db NF 120 LNA's
S/N 120 and 121

Sierra Communication Systems was in the process of installing this satellite station in **Lake Wildwood**, and three days after the equipment had been delivered and just before it was to be added to their cable system, both LNA's and the tuneable receiver were stolen, thus creating a terrible situation for them from the standpoint of having to delay completion of their physical plant and a change in their scheduling, not to mention the dollars involved.

John Craven has asked that the CATJ readers be alerted to a possible location of his stolen equipment, but is also urging cable operators to be attentive to their own equipment to forestall something like this happening to them.

Anyone knowing anything about this equipment can contact CATJ with the information, or Mr. Craven direct at the following number - 916-272-4940.

ASSOCIATE SHOWCASE

TOCOM ANNOUNCES NEW HOME SECURITY SYSTEM

A revolutionary new "home communications" security system has hit the cable industry and will make any cable-TV system where it is used the most advanced anywhere in the world.

The new **TOCOM 55 Plus** system was developed by engineers at **TOCOM, Inc.**, the Irving-based company which pioneered the two-way interactive cable technology. **TOCOM** is currently installing two-way interactive systems in over 30 communities in the US and Canada. The **55 PLUS** system, which was announced officially by **TOCOM** the end of March, will allow a home cable-TV subscriber to enjoy such advantages as:

1. Access up to 110 different video and information channels via home TV screens, as opposed to the normal 36 channels that are being offered by many of the cable-TV systems operating today.

2. A "morality coding" system that allows each home subscriber to pre-select the kinds of programs to be viewed, thus offering parents a safeguard against inappropriate programming for their children.

3. A 24-hour emergency alert system that allows a cable operator to activate TV sets and sound alarms in each home in the event of imminent community danger, such as an immediate tornado threat.

4. Selective information retrieval which allows the subscriber to retrieve information such as stock quotes, airline schedules, news articles, shopping guides, etc.

"The **55 PLUS** system is one of those milestone developments that signal a momentous step forward in the state of the art of our industry," says John Campbell, chairman of **TOCOM** and holder of some of cable-TV's key patents. "This breakthrough frees us from just about all of the technical restraints that might have kept us from bringing virtually any two-way cable service that can be envisioned directly to the consumer."

Campbell's Irving company holds six of the key patents for two-way interactive cable communications. By both sending and getting back electronic signals over the basic coaxial cable used by cable-TV operators, **TOCOM's** computerized two-way systems can monitor fire and burglar alarm systems at low cost in individual subscriber homes, allow efficient pay-per-view program selection and billing, provide at-home

instant opinion polling, offer near-instantaneous information retrieval from computerized data banks and other highly innovative services.

Using the new **55 PLUS** system, a home subscriber can tune into 55 video and 55 "text" channels at will, using a hand-held wireless remote control unit. Depending on a cable operator's offerings, the video channels may contain



any kind of programming from imported TV station programming to sporting events to movies to educational programming like that offered over the Dallas area's highly praised **TAGER** educational system.

For the 55 "text" channels, Campbell says a cable operator can choose from the wide variety of wire service news, financial reporting, weather, community service news and bulletins, TV guide listings and many other kinds of tabular and announcement information. Each of the 110 separate selections can be individually provided by the cable operator to each TV set according to the service requested by the consumer.

Campbell said that the first public demonstration of the **55 PLUS** will take place in Dallas at the National Cable Television Association convention May 18-21.

For additional information, contact John Campbell or Michael R. Corboy at **TOCOM, Inc.**, 3301 Royalty Row, Irving, Texas 75062 or call 214/438-7691

New Fixed Frequency FM Tuner From Northern CATV Sales

The **McMartin FMR-1D** is a low cost, high performance, crystal controlled broadcast tuner. This tuner insures high reliability, high quality audio

signal for station or studio monitoring or for use in sound distribution systems.

The RF front end of the **FMR-1D** is crystal controlled and utilizes a diode protected dual gate D-MOS (FET) field effect RF amplifier and a dual gate MOS-FET mixer. The D-MOS (FET) provides greater than 50db linear AGC control resulting in an overall tuner dynamic range of over 100db with minimum cross modulation. The AGC does not produce any skewing or detuning of the high "Q" RF tuned circuits.

The **FMR-1D** utilizes a new concept in tuner design providing space age technology in which the tuner actually tracks the modulated signal from the transmitter. The PTD will "lock on" and accurately recover the main channel signal identical to those originally transmitted. No multisection LC filters are used to disturb the original phase relationship of the transmitted signal reducing distortion. This system also tracks the original signal and reduces the effects of multipath.

An entirely new IF system has been designed eliminating the multisection 10.7 mHz IF band-pass filter. The system has been encapsulated within a specially designed hybrid chip. The **FMR-1D** provides better selectivity to reject unwanted signals and still provide high quality audio signals. Provisions are provided for the addition of an optional filter for exceptional high selectivity.

A specially designed mute circuit is incorporated in the chip to provide noise free muting and is a function of RF noise rather than RF input level. A relay circuit will provide either contact closure or open contacts in the absence of an RF carrier.

An audio (1C) integrated circuit is used to drive a transformer providing a balanced 600 ohm output at a level of +8dbm at 100% modulation @ 400 Hz. A 15 kHz low-pass filter is used to eliminate the troublesome 19 kHz stereo pilot signal from the audio output when used for rebroadcast or recording.

The number of components have been greatly reduced due to the use of the hybrid chip IF system. 1C's are also used in the audio system; fewer components means greater reliability.

The **FMR-1D** utilizes only 1 3/4" of vertical rack space. An illuminated front panel power switch is provided.

For more information, contact Jim Emerson at Northern CATV Sales at (800) 448-1655 or 115 Twin Oaks Drive, Syracuse, New York 13206.

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are better than one, and that even with a sophisticated corporate structure it is always wise to assure that the folks doing the work also feel that they are "plugged in" to the process. To be sure, there are times when CATA's position will not be the same as the one taken by the media conglomerates. That, from my point of view is healthy, not detrimental to the industry. CATA must, and will, remain the independent voice in the cable television industry, and the stronger that voice, the better it is for the entire industry.

Membership in CATA is more than just paying dues. It means that you are participating in the growth of the cable television industry. CATA is a forum for sharing ideas, helping fellow operators and solving the many day-to-day problems that all of us face as we try to provide the best service we can to our customers. It is an information exchange for new technology and services. And most important of all, it is an Association of individuals who care about each other and the business we are in. Your membership, big or small, CAN make a difference. Won't you join us?

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- 2) Member-systems pay regular dues to CATA on a monthly basis; Associate members pay a one time annual fee; "Individual" members pay a one time annual fee of \$25.00 per year.
- 3) CLASSY-CAT advertising is also available to non-members at the following rates: 50 cents per word with a minimum per insertion of \$20.00. A charge of \$2.00 per insertion is made for blind-box numbers or reply service.
- 4) Deadlines are the 15th of each month for the following month's issue.
- 5) Terms for non-members is full payment with order (no invoicing).
- 6) Address all CLASSY-CAT material to: CLASSY-CAT Advertising, CATJ, Suite 106, 4209 NW 23rd Oklahoma City, Ok. 73107.

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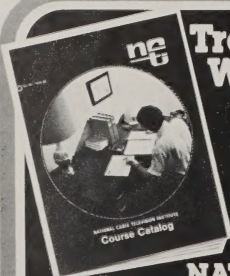
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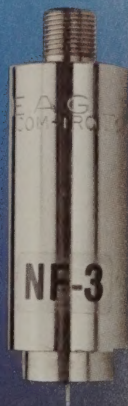
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